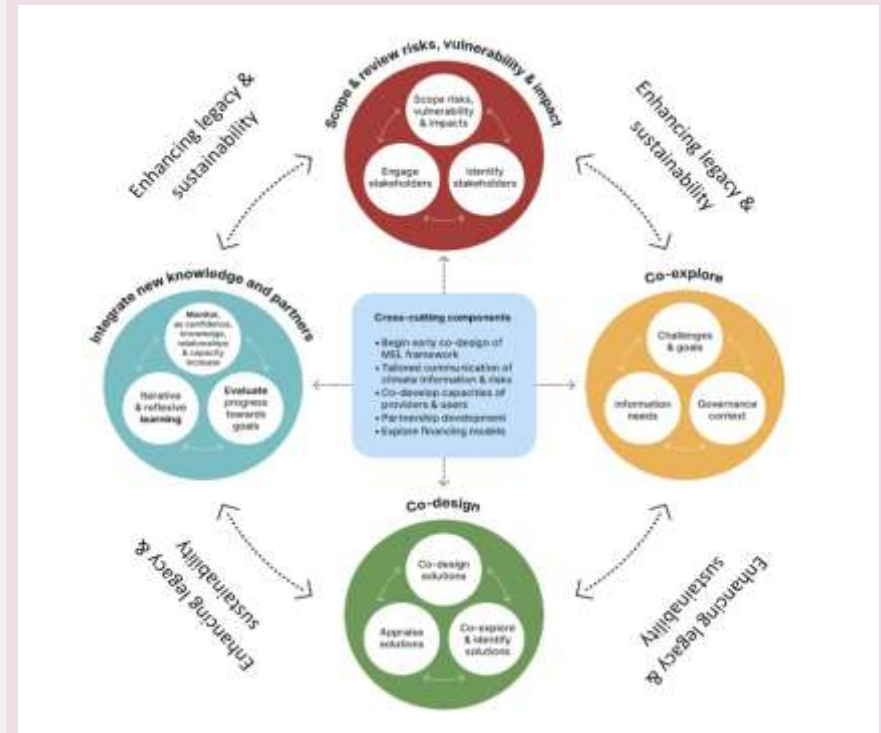


Tandem Guidance

The Tandem framework consists of a structured set of “elements” and practical guiding questions to inform actors in working together to purposefully structure their transdisciplinary engagement, interaction, and collaborative learning. The questions are informed by the elements and characteristics identified in empirical cases (Bharwani et al., 2024) and earlier frameworks (Daniels et al., 2019, 2020). The earlier processes lay the foundation for deeper discussions of shared challenges, risks, goals, governance, communication, capacity, and data and information needs later on.



The interactive guide and questions in other languages are available online: <https://weadapt.org/tandem>. Please contact authors for the Spanish version.

Scope, review, identify, engage

The processes in Element 1 can lay the foundation for deeper discussions of shared challenges, goals, governance, data and information needs in Element 2.

The Tandem framework consists of a structured set of "elements" and practical guiding questions to inform actors in *working together* to purposefully structure their transdisciplinary engagement, interaction, and collaborative learning. The questions are informed by the elements and characteristics identified in empirical cases (Bharwani et al., 2024) and earlier frameworks (Daniels et al., 2019, 2020).

* These exercises work well when building on the results from the previous exercise/phase or to feed into the next one, but most can also be applied at any stage of the process.

± Question is cross-cutting with another element and may provide useful inputs to it.

Framework element

Tandem Guidance questions

1 a) Scope and review risks, vulnerabilities, challenges and decision context (optional, not always needed)

This element follows an unstructured approach (which can be adapted for decision makers or communities) to explore issues that are not focussed on direct climate risks or impacts alone.

1. What local organizations and initiatives are already working on issues of climate resilience and related issues? Are there partnership opportunities? ±Partnership development

2. Who can provide climate (and non-climate) information? Which actors may be intermediaries or boundary partners to collaborate with in the co-production process (they may have been working in the region a long time, and created strong relationships with stakeholders which will enable better uptake and embedding of any processes)? Note that intermediaries may not be self-identifying in many contexts. What expertise can they provide? ±Partnership development

Description and notes on application

This co-exploration is designed to build and deepen understanding, with continuity and flexibility that allows for emergent and evolving ideas as capacity and relationships are strengthened throughout the process.

How can activities in early engagements be designed to build trust and a safe space for open speaking and respect between a diverse mix of participants from different backgrounds and disciplines?

Potential exercises

- Landscape mapping
- Actors e.g. MapStakes (<https://www.sei.org/projects-and-tools/tools/mapstakes-tool-mapping-stakeholders/>)
- Vulnerable groups

language exercises

- Explainer Guide (<https://www.weadapt.org/knowledge-base/climate-services/explainer-guide-co-exploring-terminologies>)
- "How to" Guide (<https://www.weadapt.org/knowledge-base/climate-adaptation-learning-resources/how-to-guide-co-exploring-terminologies>)

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	3. Which organizations, institutions or departments provide the relevant sectoral expertise and experience needed?	Can a local organizing team be established to support the logistics for and facilitation of engagements and maintain and strengthen local relationships between face-to-face engagements?	Prioritization <ul style="list-style-type: none"> • Vote with your feet
	4. What gaps in skills or expertise may need to be filled through additional partnerships?	How can venues and the length of engagements create a conducive atmosphere for learning away from day-to-day distractions?	
	5. What are the greatest challenges within the decision context that do not allow safe living conditions or a good quality of life? What is the 'lived experience'?	Come to a shared understanding of the problem and prioritize the key issues to delve into more detail on.	
	6. What are the socio-economic challenges in the region, (including factors beyond the control of decision-makers) e.g. that affect access to or management of particular resources?	Explore and review existing challenges, which may or may not be climate related. Focus on different areas of (non-climate) vulnerability as well as the indirect impacts of climate change.	
	7. What is the current use of climate information - what relevant climate services or reports are available with regards to other risks and impacts (disaster, environmental, social etc.)?	Start to review current use of climate information, climate services, available reports and relevant material with regards to other risks and impacts (disaster, environmental, social etc) and identify possible decision support needs for adaptation planning that increases climate resilience.	
	8. Which groups are impacted on the ground (e.g. at community level) and can provide representative voice(s)?	Scope potential needs and interests of different stakeholder groups for the next stage, 'Identifying and engaging actors'.	
	9. What are the different communities and activities at risk? How does vulnerability differ amongst groups and activities? Why are they vulnerable? Be open to sources of vulnerability that are not necessarily related to climate. E.g., related to dynamic social vulnerability.	What engagements might work best to bring other stakeholders into the process as needed? e.g. one on one meetings, smaller dialogues with selected participants.	
	10. Where are the most vulnerable areas and why are they vulnerable? Be open to vulnerability that is not necessarily related to climate. E.g., related to ecosystem services.	How can information developed in the process be shared on a regular basis with participants to keep everyone informed of progress?	
	11. If there are other types of vulnerability (e.g. socio-economic) that are not necessarily related to climate, what drives this vulnerability?	For the different actors identified, prioritize the adaptation challenges that are most pertinent to deal with first.	
	12. Do climate or weather events and impacts affect/exacerbate these vulnerabilities, and if so, in what way?		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	13. Is there any risk of exacerbated vulnerability here or elsewhere, due to compound or cascading risks?		
	14. What language is used by different actors to describe the same concepts e.g., related to risk, vulnerability, resilience etc.? Can less technical (or local) language be used? How do these terms translate into the day-to-day work of actors? Can a shared understanding of different terms and their usage be reached? ±Communication		
1 b) Identify relevant actors, affected groups, decision makers & champions	1. What are different stakeholders' (users, intermediaries and providers) roles and responsibilities in influencing or managing the adaptation challenge (and related issues) identified in the Scoping stage? ±1a Scoping	Identify and engage actors in the knowledge co-exploration and co-production process for whom climate information is useful i.e., this may include both actors who do and do not have power to influence decision-making regarding the adaptation challenge and related issues, but who are affected by it.	Build on the mapping above*
	2. Which (and whose) decisions and actions can influence the resilience of the system? Which actors are impacted by these issues, are vulnerable to them, or consider them important? What are the relationships between these actors?	Identify and engage collaborators, particularly local intermediaries and boundary partners.	Social network mapping* (add in actors relevant to the issue, on the map, their role and mandate, relationships, relevant policies, information flows and connections).
	3. Which institutional actors are critical to engage in this process? E.g. the local meteorological department or NHMS; national government; local government decision-makers and councillors; private sector; civil society, etc.	Depending on power, gender, other social identities, and knowledge dynamics, it may be important to have a mixture of individual and small group discussions instead of just larger group interactions.	e.g. Developing a social network map to frame adaptation action in the Guadiana river basin (Spain): https://www.weadapt.org/knowledge-base/climate-adaptation-training/social-network-mapping-in-the-guadiana-river-basin
	4. Can champions or change agents be identified in these organizations? Do they already exist?	You may need to employ different methods of engagement, such as individual interviews / questionnaires / surveys etc. to avoid power dynamics that may present themselves.	
	5. For the different actors identified, what are most pertinent adaptation challenges to deal with first?		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	6. In all the participatory processes planned, is there a balanced representation across gender and other social identities? If not, how can this be addressed?		
	7. Is there a difference in the capacity of men and women (or other groups, e.g., differentiated by socio-economic status, ethnicity, race, etc.) to face the challenges identified? Consider the impacts of these varying levels of sensitivity and adaptive capacity when planning adaptation interventions and communication. ±Capacity development ±Communication		
1 c) Engage relevant actors & champions	1. What key knowledge systems exist? Which actors hold relevant knowledge? Are there actors we need to engage, who bring different perspectives of local or indigenous knowledge or encompass different characteristics related to socio-economic status, institution, knowledge type, gender, ethnicity, age disability, race, religion etc? Are they willing and able to share this knowledge? If not, how can this be facilitated e.g. with the support of intermediaries or boundary partners? ±Partnership development	Identify and engage actors in the knowledge co-exploration and co-production process for whom climate information is useful i.e. this may include both actors who do and do not have power to influence decision-making regarding the adaptation challenge and related issues, but who are affected by it.	Build on the mapping above* • Influence vs importance matrix*
The processes in Element 1 can lay the foundation for deeper discussions of challenges, goals, governance and information needs in Element 2.	2. How should interactions throughout the process be coordinated? How can these be mutually agreed between all stakeholders? Is there a shared understanding and joint ownership of the process? How and when should we engage all relevant actors identified from this process? Which actors are critical to engage with most deeply in the co-exploration and co-production process? And which actors need to be engaged on a less regular basis? Are there key points in the process where particular actors will be needed for their knowledge or expertise?	Identify and engage collaborators, particularly local intermediaries and boundary partners.	When thinking about how interaction and joint ownership of the process, Memorandums of Understanding defining the engagement can be an important way to formalize interactions. This can allow stakeholders the space to give adequate time to the project.
	3. Are there multiple decision-makers at different scales, for whom different climate information (and formats) would be required based on the different types of decisions they are making? What methods of engagement (and communication styles/formats) are needed to ensure that the differentiated groups of actors identified, are engaged? E.g., socio-economic status, institution, knowledge type, gender, ethnicity, age disability, race, religion etc? ±Communication	Reach mutual agreement of roles and responsibilities and how engagement throughout the process will be managed (a shared understanding and joint ownership of the process).	This can also allow the creation of an Embedded Researcher model which is key to getting a deeper understanding of context, developing trust with local actors, and identifying or creating 'windows of opportunity' for the greatest impact.

Co-explore – go deeper

Questions on socio-economic challenges (Element 1) are equally important to cover (even if the scoping stage is not needed because previous work has been done), so they are also included in Element 2.

This is an opportunity to delve deeper into some of the same questions with the more targeted group of stakeholders that has been identified in Element 1.

Many of these questions will be returned to in later stages, as understanding of issues, capacity and confidence increase.

* These exercises work well when building on the results from the previous exercise/phase or to feed into the next one, but most can also be applied at any stage of the process.

± Question is cross-cutting with another element and may provide useful inputs to it.

Framework element

2 a) Co-explore challenges and goals

This early stage may provide opportunities to co-develop contextualized impact indicators with stakeholders for monitoring progress towards achieving shared goals.

Tandem Guidance questions

1. What adaptation issue(s) are being experienced? What drivers of these issues can be identified and co-explored (both climate and non-climate e.g. physical, social, economic, political)? If the adaptation issue has many elements, it can help to break these down to co-explore their various drivers, recent trends and the spatial and temporal scales on which to focus. Actual and perceived drivers may emerge, and the issue of attribution i.e. which factors are predominantly driving issues can be discussed.

Description and notes on application

This process will facilitate narrowing and co-defining a focused aim and expectations for the climate information. This aim may change as decision makers and other collaborators increase their understanding of climate information, its availability and associated uncertainty. Thus, many of these questions will be returned to in later stages, as understanding of the issues and capacity to interpret and apply climate information increases. Multiple aims may exist and some consensus on priorities is needed as different services should be tailored for different user groups.

Potential exercises

Build on the mapping above*
• System/Mess/Issue mapping*
(add in issues and drivers on the map and ask participants to link what they perceived to be causal factors, see more detail in 2b)

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
<p>This element follows an unstructured approach to explore issues that are not just focussed on direct climate risks or impacts.</p>	<p>2. What is the range of knowledge, perception and experience of different actors (e.g., local farmers, agricultural extension officers, climate scientists, city planners, private sector, technical advisors, policy makers) on climate risks, adaptation challenges and solutions to identify synergies and potential silos? How does this compare to more conventional, climate science perspectives and can they be connected or linked in some way?</p>	<p>Finding ways to build trust and credibility, acknowledging differences in pluralistic values, norms, preferences and viewpoints, is key to a sense of ownership and uptake.</p>	<p>Can site visits or hearing examples from other cities or contexts help to spur discussion, co-exploration and unpacking of the adaptation issues?</p>
	<p>3. What are the adaptation challenges expressed by stakeholders that could be addressed with better climate information?</p>	<p>Consider how activities and engagements can be designed to co-explore and recognise different perspectives and priorities and address the complexity of system-wide multi-sector issues in a collaborative and simple/accessible way.</p>	<p>Is it useful to apply an approach such as climate risk narratives (Jack et al., 2020), which are stories of the future that can incorporate a range of sectors, impacts, perceptions and outcomes, as a vehicle for</p>
	<p>4. Who is affected by this and how? Which groups (e.g. by community, livelihood, location or activity) or exposure units are affected? How are groups differentiated and what are the characteristics that may contribute to their vulnerability? e.g. socio-economic status, institution, knowledge type, gender, ethnicity, age disability, race,</p>	<p>How can participation and the use of interactive games, the creation of spaces for informal conversations and the use of humour and/or art encourage or aid co-exploration?</p>	<p>You may need to employ different methods of engagement, such as individual interviews / questionnaires / surveys etc. to avoid power dynamics, that may present themselves.</p>
	<p>5. What are the climate risks, sectors and spatial and temporal scales that this adaptation challenge manifests? ±Co-explore information needs</p>	<p>This element supports identification of multiple complex and interacting issues related to an adaptation challenge (or challenges) and the groups/ exposure units it affects.</p>	
	<p>6. What current and projected climate impacts interact with or exacerbate the adaptation challenge (or may do so in future)?</p>	<p>Identify the objectives of all those involved which may be somewhat different but feed into a common shared goal for climate resilience, the climate service and the co-production process itself.</p>	
	<p>7. What other (non-climate) drivers of change, related to social vulnerability and socio-economic development trends, interact with or exacerbate the adaptation challenge (or may do so in future)?</p>	<p>Consider how these can be addressed in a cohesive, collaborative way without excluding any valid viewpoints or needs.</p>	

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>8. What are the linkages between these other, potentially more pressing, development issues (e.g. water / energy security, high unemployment, growth of informal areas, failed harvests) and climate change? These linkages may not be immediately obvious or evident to stakeholders, but the complexity of system-wide multi-sector issues is key to explore to ensure climate-resilient development pathways.</p>		
	<p>9. Are there opportunities to bridge or integrate scientific, indigenous and local knowledge systems? (e.g., seasonal climate forecasts and traditional forecasting systems based on cultural beliefs about nature and ecology).</p>		
	<p>10. Are there existing climate-related services (including environmental and meteorological monitoring services, early warning systems, indigenous or traditional forecasting measures) that have been used to reduce</p>		
	<p>11. Could these existing climate services, or climate-related services, be useful? What is their focus? How can they be connected to their results and made interoperable with needs on the ground and governance capacities.</p>		
	<p>12. What is the potential to build upon existing credible and trusted climate (and non-climate) services to develop a more tailored service?</p>		
	<p>13. Are they considered credible and trusted by different actors and how are they used? If they are not trusted sources, why is this? How could trust be improved?</p>		
	<p>14. Is there adequate training and capacity development on these services? Is this too technical or specialist or not tailored enough to the local context? ±Capacity development</p>		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	15. What are the shortcomings/gaps and benefits of these services for decision-makers? What actions have been informed by these services?		
	16. What indicators can be co-developed to monitor and evaluate the effectiveness and value of the climate information to support decision-makers to address the adaptation challenge? (these should be co-developed with all actors in the process) ±MEL		
	17. What indicators can be co-developed to monitor the impact of the co-production process particularly where outcomes are intangible? (these should be co-developed with all actors in the process) ±MEL		
2 b) Co-explore governance context	1. What decisions (e.g. at the policy, institutional or individual level) address the adaptation challenge and may benefit from a climate service or better climate information? How are these decisions made currently?	Consider the different levels of participation or engagement of actors and their knowledge in decision-making when co-designing co-production activities. E.g. gender-based, formal or informal e.g. at the policy, institutional, or individual level.	Build on the mapping above* Influence vs importance matrix*
Consider the different types, scales and levels of participation, engagement and knowledge in decision-making when co-designing co-production activities. Also consider risks of maladaptation, compound and cascading risks.	2. What institutions have responsibility or mandates for the issues being discussed and for data production and sharing? ±Co-explore information needs	Co-create a clear understanding of the governance and institutional contexts in which the climate service will be used.	Mess mapping* 1. Start with challenge identified above. 2. Which institution(s) is responsible for dealing with it? What is their mandate? 3. Are there policies/networks/initiatives linked to this? 4. What are potential solutions? ±Co-explore information needs

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	3. How much horizontal and vertical coordination and collaboration exists in key organizations to support joined up planning, policy and action?	Identify windows of opportunity for integrating climate information to operationalise and institutionally embed it.	Climate Capacity Diagnosis & Development tool:
	4. Are multiple risks being considered (climate and non-climate) and is there any risk of maladaptation, compound or cascading effects in other departments, sectors or locations?	Co-explore and assess adaptation solutions based on different stakeholder perspectives.	https://www.weadapt.org/knowledge-base/adaptation-decision-making/climate-cadd
	5. Are there multiple decision-makers at different levels and scales, for whom different climate information (and formats) would be required based on the different types of decisions they are making? (such as 'community groups' or households). ±Communication	Have specific needs emerged from the co-exploration phase so far? This may be particular needs or requests for training, further exploration and unpacking of a particular aspect of the adaptation issue or engagement of additional stakeholder groups identified as critical to decision-making processes.	
	6. How can discussions be designed to co-explore the agreement or uncertainties around mandates and responsibilities and institutional capacity strengths and gaps that exist in organizations with mandates for planning, action and data production and sharing? ±Capacity development	Which decisions are critical to unpack further and support with climate – and other – information?	
	7. In the policy, planning and implementation landscape, what plans, projects and policies are in place or in the pipeline to address the adaptation issue(s) and climate impacts? Are these considered sufficient or is further work required to strengthen or broaden policies, projects or implementation?		
	8. How have such responses been funded and what opportunities exist for funding future projects? Is there a business case for action? ±Funding models		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>9. What existing solutions and recommendations can be identified? These may be the design and delivery of particular outputs, projects, policies, the strengthening of capacities through particular training or support, innovations in data sharing or the development of new partnerships or increased collaboration between institutions. Are these at appropriate temporal and spatial scales to address the adaptation issue(s) identified? ±Co-explore information needs ±Capacity development ±Partnership development</p>		
	<p>10. Can examples from other cities or contexts help to spur possible adaptation measures?</p>		
	<p>11. How do adaptation solutions affect different stakeholder interests? Are there any synergies/mutual benefits and/or conflicts with other goals and policies?</p>		
	<p>12. Where have “windows of opportunity” been identified or created in policy development, planning processes or projects where climate information can be integrated? E.g. through a new political cycle, through issues high on the current political or social agenda, or through new initiatives, tools or processes that are under development or on the horizon.</p>		
	<p>13. How can solutions build on existing efforts and initiatives or leverage existing partnerships to limit replication of work? ±Partnership development</p>		
	<p>14. Which structures or actors are needed to contribute to or support the delivery of these solutions?</p>		
	<p>15. Is there any difference in representation (e.g. of men and women, other social identities or knowledge types) in the decision-making process, that affects use of, or access to climate information?</p>		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	16. Does this representation affect the management, use of, access to, and/or distribution of resources? e.g., for different economic activities, for household consumption etc.		
	17. Is there any difference in representation (e.g., of men and women, other social identities or knowledge types) in their ability to influence the decision-making process?		
	18. Are there gender or social identity-related differences within the legal framework related to the control of resources?		
	19. Are there institutional- or policy-relevant "windows of opportunity" such as the potential to embed the climate service in legislative frameworks that can support its long-term sustainability? ±MEL ±Funding model		
	20. What is the urgency and magnitude of the adaptation challenge? Does public perception of the challenge and related issues provide an opportunity for action or do other trigger points exist?		
	21. What are the potential institutional and governance arrangements for the institutionalization of the climate service?		
	22. Which actors are responsible for the production, dissemination and management of climate data and information? Which actors require such information in what format? Which actor(s) could be responsible for administering the climate service or coordinating the necessary information sharing and packaging? Is there willingness and opportunity for partnership building, collaboration and coordination between these actors? ±Co-explore information needs ±Communication ±Partnership development		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>23. What funding sources are available, and can a sustainable funding and governance model be developed for the continued improvement and accessibility of the climate service? ±Financing models</p>		
	<p>24. How can the value of the climate service be effectively communicated to higher level decision-makers, e.g. the economic and/or social benefits deriving from the use of the climate service? ±Financing models ±Communication ±MEL</p>		
	<p>25. Are there practical constraints to developing a climate service (e.g. time, budget, cultural, human and financial capacities)? How does this affect the aim of the climate service? How can these constraints be best addressed? ±Partnership Development ±Financing models</p>		
	<p>26. How is the strategy to operationalise and institutionalize the climate service implemented? Which are the key actors with defined roles and responsibilities to take forward the strategy? Are there any capacity gaps that need addressing for this to occur? ±Capacity development</p>		
<p>2 c) Co-explore information needs</p>	<p>1. Has climate information (scientific or local/traditional/indigenous) already been factored into climate-sensitive decisions either at individual decision-making or policy making levels? If so, which decisions, how, when and by whom?</p>	<p>Consider how activities and engagements can be designed to dig deeper into information needs and co-explore the assumptions and trade-offs when distilling key messages from data?</p>	<p>Differentiated engagements with subsets of stakeholders are important to consider here e.g., smaller technical working groups or “deep dives” that can provide input and feedback to wider engagements with all participants may be useful.</p>

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
<p>Co-explore information needs, data, models, sources, assumptions and formats</p> <p>Understand specific climate data and information required by users; the capacity building interventions needed to interpret and apply it; and, how this information is best presented and communicated to support its uptake and use.</p>	<p>2. Were there any limitations in the use/application of this information in these decisions? If so, what were they? Has other non-climate evidence been factored into these decisions?</p>	<p>In relation to the interpretation of climate information, this is likely to involve exploring assumptions made by climate scientists e.g. how particular projections or plots have been developed, which models have been used and why, which downscaling methods and spatial resolutions have been used and why, and the levels of uncertainty associated with such information.</p>	<p>Co-exploring terminology and language exercises. Use of non-technical language and visuals is important.</p>
	<p>3. How can activities be designed to communicate to and engage participants on various approaches to climate risk assessment, global climate modelling and projections and downscaling of data? The use of graphics, maps or narratives may assist in communicating medium to long-term climate patterns and change with different stakeholders. ±Communication</p>	<p>Deepen the discussion of existing data use and climate information needs bringing together (where relevant) decision-makers, users of climate information, intermediaries, knowledge brokers, practitioners, the private sector and climate information providers etc.</p>	
	<p>4. What existing weather or climate information is available from local providers e.g. meteorological departments, NHMS, private companies or research institutes? Are there any opportunities that can be identified to build on or adapt these existing services to address information needs? In addition to data availability, discussions about data access and sharing are important to uncover to assess opportunities for sharing data more widely or in different, innovative and more accessible ways.</p>	<p>Develop a comprehensive understanding of: specific climate data, language and information required by users; the capacity building interventions needed to interpret and apply it; and, how this information is best presented and communicated to support its uptake and use.</p>	<p><u>Language and Terminology exercise: Explainer Guide</u> https://www.weadapt.org/knowledge-base/climate-services/explainer-guide-co-exploring-terminologies</p>

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>5. What local research related to the adaptation challenges has been undertaken? E.g. to better understand climate impacts at the local scale or in relevant sectors?</p>	<p>Co- explore the usefulness and relevance of existing information/models/data, how they can be more tailored to the decision context and applied by relevant actors, through appropriate capacity development.</p>	
	<p>6. What is the time horizon(s) and spatial scale of decision-making needs? Can specific information needs at relevant time and spatial scales now be articulated for particular decision-making processes or the development of plans, processes or tools? These information needs may be weather and climate-related but also wider e.g. groundwater abstraction and recharge rates, rates of population growth and projected water demand.</p>	<p>How can activities and discussions be designed to drill down and co-explore decision-making? i.e. what time and spatial scales are decisions made upon, what information currently informs these decisions, how and by whom can decisions be informed e.g. by informal processes or actors?</p>	<p>Language and Terminology exercise: "How to" Guide https://www.weadapt.org/knowledge-base/climate-adaptation-learning-resources/how-to-guide-co-exploring-terminologies</p>
	<p>7. How can such sessions be designed to be accessible to the varying levels of technical capacity and knowledge of participants? ±Capacity development</p>	<p>Have specific needs emerged from the co-exploration phase so far? This may be particular needs or requests for training, further exploration and unpacking of a particular aspect of the adaptation issue or engagement of additional stakeholder groups identified as critical to decision-making processes.</p>	<p>Mapping *</p> <ul style="list-style-type: none"> • Identify the usefulness of different types and formats of climate information for different groups.
	<p>8. How is data and information being communicated, shared and disseminated? How does this need to be tailored to different groups e.g. technical staff, senior decision-makers, media etc? ±Capacity development ±Communication</p>		
	<p>9. What differentiated information (and formats) are needed by different individuals and user groups at different temporal and spatial scales? (e.g. are there multiple aims for climate information identified in the earlier stages)? ±Communication</p>		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>10. What are users' (e.g. individual households, farmers etc) detailed (climate and non-climate) data and information needs (e.g. forecasts including particular parameters, temporal and spatial scales, quantitative or qualitative data etc.) for identifying, appraising and evaluating adaptation options?</p>		
	<p>11. What language is used by different actors to describe the same concepts e.g., related to risk, vulnerability, resilience etc.? Can less specialist or less technical (or local) language be used? How do these terms translate into the day-to-day work of actors? Can a shared understanding of different terms and their usage be reached? ±Communication</p>		
	<p>12. Are data available to represent the different vulnerabilities identified earlier (including social vulnerability), and include them in any further analysis? If not, can this information be presented in other ways? ±Communication</p>		
	<p>13. Are adequate training and capacity development available for the use of climate information, services or tools? Do these require technical or specialist knowledge and are they tailored to the local context? ±Capacity Development</p>		
	<p>14. What method(s) and tools are suitable for the appraisal and evaluation of different adaptation options? What data and information needs are required for these methods? ±Identify, appraise and co-design solutions</p>		
	<p>15. What existing data and information is available, and are these trusted sources? Which actors hold this data and information? ±2 b) Co-explore governance context</p>		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>16. What are the limitations of currently available climate information? If no relevant climate information can be provided to date, are there non-climate services-related efforts with overlapping interests which could be explored/applied to partly address these concerns?</p>		
	<p>17. Are there other knowledge systems that need to be considered and included in the design of the climate service e.g. research and practice-based knowledge, and indigenous knowledge? How can these be integrated or aligned?</p>		
	<p>18. In what formats do users prefer or require climate information e.g. risk maps, probabilistic charts, seasonal time-series etc.? In which formats do users prefer or require information on uncertainty? ±Communication</p>		
	<p>19. What planning tools or impact models are used and what are appropriate formats of climate information that could best be integrated or considered alongside such climate services? ±Communication</p>		
	<p>20. Are there related capacity needs to interpret model outputs? E.g., due to a lack of suitable tools or limited technical expertise ±Capacity Development</p>		

Identify, appraise & co-design

Questions to support the co-production of knowledge.

* These exercises work well when building on the results from the previous exercise/phase or to feed into the next one, but most can also be applied at any stage of the process.

± Question is cross-cutting with another element and may provide useful inputs to it.

Framework element

3) Co-identify, appraise and co-design solutions

Appraisal should include consideration of uncertainty, maladaptation, compound and cascading risks, synergies, trade-offs

Tandem Guidance questions

1. What early actions could be implemented (for example in the next five years) to address the adaptation challenge (and related issues)?
What early "no regrets" actions exist that do not lock decision-makers into long-term, irreversible or costly actions?

Description and notes on application

Identification and application of appropriate decision-support methods that can integrate climate (and non-climate) information to identify, sequence and prioritize a set of interventions covering short to medium-term and future adaptation strategies. Appraisal should include consideration of uncertainty, maladaptation, synergies, trade-offs and co-benefits.

Potential exercises

Use individual questionnaires to validate proposed adaptation strategies, and group questionnaires to examine different roles and mandates.

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>2. What decision support methods and approaches are suitable for the appraisal and evaluation of adaptation options? (the selection of approaches will depend on, and be guided by, the type of adaptation challenge, users' priorities and objectives, how decisions are made, and the availability of particular data and information) What decision support tools are already used by decision-makers? What (climate and non-climate) information do these methods use? (linked to previous stage) Can these analyze and assess the available data and information on current and future (climate and non-climate related) risks?</p>		<p>Some methods for appraising options: https://www.weadapt.org/knowledge-base/adaptation-decision-making/mediation-technical-briefing-notes</p>
	<p>3. What decision methods can help to manage and address uncertainty, including the potential for maladaptation? How is uncertainty best communicated, both to direct users but also to senior decision-makers? ±Communication</p>		<p>Some methods for appraising options: https://www.weadapt.org/knowledge-base/adaptation-decision-making/research-methods-for-understanding-and-supporting-</p>
	<p>4. What capacity building interventions (individual and institutional) are needed to minimize the risk liability placed on users? ±Capacity development</p>		
	<p>5. Which methods can support an economic analysis of options to aid the selection of priority actions?</p>		
	<p>6. What are the synergies, trade-offs and co-benefits that need to be considered? How can these be managed? In what formats do users prefer or need information on the benefits, synergies and trade-offs of different adaptation options? ±Communication</p>		
	<p>7. Based on the selection of decision support methods, is there additional data and information required for option appraisal and is there a need to return to providers (or other actors) for further information?</p>		
	<p>8. What indicators can be used to monitor and evaluate the appraisal, prioritization and sequencing of options to address the adaptation challenge? (these indicators should be co-developed with all actors in the process, including differentiated user groups). ±MEL</p>		

Monitor, evaluate & learn

Cross-cutting elements to integrate and sustain new knowledge and partnerships.

Apply iterative and reflexive learning to deepen understanding of adaptation challenges. Monitor progress towards goals as confidence, knowledge, relationships and capacity increase.

* These exercises work well when building on the results from the previous exercise/phase or to feed into the next one, but most can also be applied at any stage of the process.

± Question is cross-cutting with another element and may provide useful inputs to it.

Framework element

Tandem Guidance questions

Monitor, evaluate & learn (MEL)

1. Are there existing MEL systems or platforms in place or do they need to be developed to support these activities?

2. Can learning objectives be agreed for the process or for specific engagements?

3. Can indicators be developed to measure impact particularly where outcomes are intangible?

Description and notes on application

Monitoring, evaluating and learning (MEL) considerations should be integrated throughout the elements above and any learning should further refine and hone iterative co-exploration and co-production processes. Regular and systematic feedback mechanisms should be established. Apply learning to deepen understanding of adaptation challenges. Monitor progress towards goals as confidence, knowledge, relationships and capacity increase.

Potential exercises

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	4. How can reviews and reflections provide feedback and learning for the process?		
	5. How can a culture of learning and reflection be encouraged between all participants?		
	6. Can the process be anchored through developing tangible outputs or projects?		
	7. What are the roles and responsibilities for different actors for regular and systematic feedback (i.e. obtaining, collating and acting upon feedback to refine services)? Where and how can such feedback mechanisms be integrated into existing monitoring systems? Are there any capacity gaps that need addressing for this to occur?		
	8. What individual and institutional capacity building interventions are required to embed the service and for regular and systematic feedback? ±Capacity development ±Partnership development		
	9. What financing arrangements are required for the embedding of the service and for regular and systematic feedback? ±Financing models		
	10. What indicators can be used to monitor and evaluate the effectiveness and value of the service i.e. the effectiveness with which the climate service can support decision-makers in adaptation decision-making? (these indicators should be co-developed with all actors in the process, including differentiated user groups).		
	11. What indicators are needed to assess uptake and impacts of the climate service on different user groups?		
	12. How will these indicators be revisited with users to ensure that they continue to be accurate and appropriate measures of effectiveness? Which actors are responsible for this?		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>13. What are appropriate metrics and methodologies to evaluate the degree to which the climate service can meet its objective(s), and the degree to which the co-production process has led to the development of an effective climate service/process?</p>		
	<p>14. Which actors are responsible for carrying out MEL activities during the design and development of the service and on an ongoing basis during its uptake and use? This should include mechanisms whereby user feedback on the process and the service (including from different user groups) can be collated and evaluated to enable adaptive development (both during the design/development of the service and its ongoing use).</p>		
	<p>15. Which actors are responsible for sharing lessons learned from feedback, both internally with key actors, but also into the rapidly expanding climate services sector to share knowledge on challenges, barriers and solutions, and avoid redundancy? (see Learning framework – Table 2 in Daniels et al., 2020).</p>		

Communication

Cross-cutting elements to integrate and sustain new knowledge and partnerships.

Apply iterative and reflexive learning to deepen understanding of adaptation challenges. Monitor progress towards goals as confidence, knowledge, relationships and capacity increase.

* These exercises work well when building on the results from the previous exercise/phase or to feed into the next one, but most can also be applied at any stage of the process.

± Question is cross-cutting with another element and may provide useful inputs to it.

Framework element

Tandem Guidance questions

Description and notes on application

Potential exercises

Communication

1. What key messages and new information emerging from the process need to be communicated to key influencers and senior decision-makers?

The aim is to improve the relevance, credibility, legitimacy and useability of climate-related information.

Differentiated engagements with subsets of stakeholders are important to consider here e.g. high-level meetings with senior decision-makers to convey strategic messages. It may be important to reach stakeholders at varying scales e.g. not only local government decision-makers but also those responsible for national policy setting, as well as other groups and

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>2. Are there multiple decision-makers at different scales, for whom different climate information (and formats) would be required based on the different types of decisions they are making? What methods of engagement (and communication styles/formats) are needed to ensure that differentiated groups of actors are engaged? e.g. by knowledge type, background, institution, socioeconomic status, gender, age, race, religion. ±Identifying and engaging stakeholders.</p>	<p>According to gender roles and other social identities, climate information communication needs are also different. To have a better understanding of these differences, gender/identity-sensitive communication questions are recommended.</p>	
	<p>3. What language is used by different actors to describe the same concepts e.g., related to risk, vulnerability, resilience etc.? Can less specialist or less technical (or local) language be used? How do these terms translate into the day-to-day work of actors? Can a shared understanding of different terms and their usage be reached?</p>	<p>How can climate information be best tailored (e.g. formats, appropriate temporal and spatial scales) to meet the adaptation challenge (±2 a) Co-explore challenges and goals), fit the decision and institutional contexts (±2 b) Co-explore institutional context), address the needs and objectives of users (±2 c) Co-explore information needs) making them understandable and usable? ±Communication</p>	
	<p>4. How do climate services and specific resource managers e.g. water, communicate with communities? What participatory means of communication are used?</p>		
	<p>5. In participatory communication processes, are needs across gender and other social identities considered? If not, how can this be addressed?</p>		
	<p>6. Which other actors should be engaged as part of a broader dissemination and engagement strategy (e.g. through demonstrations and presentations)?</p>		
	<p>7. Who or what processes, in addition to knowledge brokers, would support iterative and effective communication? E.g. collaborative group processes, institutional champions, boundary organizations, knowledge networks, etc.</p>		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>8. What existing knowledge do users have on the availability of climate information and formats? Is there additional knowledge they need to maximize the effectiveness of their role in the co-design process? How do communication needs vary between users involved in the design of the climate service/process and those who will use the final output?</p>		
	<p>9. How can this information be communicated most effectively to achieve application and uptake, including which communication channels/modes are most appropriate (and timely)?</p>		
	<p>10. Does information need to be tailored and communicated differently for differentiated user groups e.g. by knowledge type, background, institution, socioeconomic status, gender, age, race, religion? If so, how?</p>		
	<p>11. How are uncertainty, synergies and trade-offs communicated most effectively? ±Identify, appraise and co-design solutions</p>		
	<p>12. What are direct users' needs in communicating evidence from a climate service/process (e.g. emerging risks) to actors higher in the decision-making chain? How can this evidence be communicated most effectively?</p>		
	<p>13. How can the economic and/or social benefits of taking 'early action' using climate information (i.e. the value of climate information or a climate service/process) be communicated effectively?</p>		

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>14. What mode of dissemination do users prefer or require, including differentiated groups (e.g. by knowledge type, background, institution, socioeconomic status, gender, age, race, religion)? For example, is limited internet access or intermittency an issue for users? Are there transfer or sharing mechanisms or systems that already exist?</p>		

Capacity development

Cross-cutting elements to integrate and sustain new knowledge and partnerships.

Apply iterative and reflexive learning to deepen understanding of adaptation challenges. Monitor progress towards goals as confidence, knowledge, relationships and capacity increase.

* These exercises work well when building on the results from the previous exercise/phase or to feed into the next one, but most can also be applied at any stage of the process.

± Question is cross-cutting with another element and may provide useful inputs to it.

Framework element

Tandem Guidance questions

Capacity development

1. Has capacity development already taken place and has this improved the use of climate information and its uptake?

2. What capacity needs and gaps exist, not only for differentiated groups of users but also providers and intermediaries? What needs have been identified through an early assessment of human, technical, analytical and institutional capacity? Are other capacity gaps emerging from the wider process?

Description and notes on application

Capacity gaps are identified and addressed.

Capacity development is a by-product of this entire process. Does this improve the use of climate information and its uptake?

Potential exercises

Framework element	Tandem Guidance questions	Description and notes on application	Potential exercises
	<p>3. Capacity needs may differ between actors involved in the co-design process and those that have not been part of the process. What capacity needs exist for providers, intermediaries and differentiated groups of users external to the design process?</p>		
	<p>4. What capacity needs and gaps exist for senior decision-makers who receive information from direct users of the climate service?</p>		
	<p>5. Are there particular capacity needs related to the understanding of complex concepts such as uncertainty?</p>		
	<p>6. What individual and institutional capacity development interventions are required to embed a climate service and for regular and systematic feedback? (e.g. writing funding proposals, developing MEL expertise etc.) ±Funding model ±MEL</p>		
	<p>7. What form of training or capacity building is required, and for whom, to address capacity needs/gaps for integrating climate information within decision-making processes over the long-term? How can tailored plans be developed and implemented/funded? This may include delivering technical training in interpreting climate data/information, enhancing operational processes, strengthening communication and collaboration between relevant actors, or building senior level buy-in and leadership on climate informed decision-making. ±Funding model</p>		
	<p>8. Experiential learning through the design process e.g. through role plays, art, humour, serious games and hands-on exercises can help to explore concepts and build capacity across the different actors involved in the process.</p>		