

# Participatory scenario building for climate resilience: A guide tested in Ghana

## Introduction: Setting the stage for climate resilience planning

Climate change is a threat to resilient development in many countries (Sanson and Masten 2024). For instance, rising global temperatures risk pushing nations towards dangerous tipping points, potentially undermining the targets of the Sustainable Development Goals (SDGs). The impacts of climate change affect multiple sectors, including agriculture, water, health, transportation, and industry, with disproportionate impacts on vulnerable populations (Shafique et al. 2024). Adapting to these adverse impacts and building resilience is no longer just an option but a necessity for sustainable growth, preventing future costs, safeguarding lives, and ensuring socioeconomic progress (Global Commission on Adaptation 2019).

Building climate resilience is important for enhancing positive social transformation (Schipper et al. 2021). However, the key

challenge in sustaining desirable societal transformation lies in simultaneously achieving the sustainable utilization of natural resources (e.g., land, biodiversity) for food security while maintaining sustainable and inclusive economic growth (Hertel et al. 2021). This is a critical challenge that requires urgent solutions. In Ghana, as in many developing countries, the planning of climate resilience interventions is currently embedded in the broader formulation and implementation of national and subnational development agendas (Atanga et al. 2017). To effectively address the impacts of climate change, decision-makers must have an in-depth understanding of context-specific climate risks and vulnerabilities from a multiple-stakeholder perspective. However, in many instances, they have limited capacity to jointly gather and synthesize relevant information with diverse stakeholders and to formulate and implement climate resilience interventions. Thus, to respond to the uncertainties of climate risks, decision-makers must enhance their participatory planning capabilities.



Stakeholders during a group discussion at the Participatory Scenario-Building Workshop held in Wa, Upper West Region, Ghana (photo: AKD Shares Unlimited for IWMI).

Participatory scenario planning entails building plots to support the formulation and implementation of inclusive and sustainable climate resilience interventions. It is a collaborative process that brings together diverse stakeholders. It values local knowledge and ensures that resilience strategies are relevant, and that communities have shared ownership of climate adaptation options. It is usually employed to develop pathways that link present issues to future aspirations and priorities. Therefore, it is very useful for designing appropriate interventions that target (in)direct drivers of societal transformation towards win-win future outcomes. Scenarios can be framed either qualitatively, using descriptive language to articulate potential futures, or quantitatively, through numerical estimations (Amer et al. 2013).

This guide provides a structured approach to participatory scenario building using the Three Horizons Framework, enabling community leaders, development planners, and project managers to facilitate meaningful engagement with diverse stakeholders in planning climate resilience. It is based on a comprehensive review of literature and a framework developed during a scenario-building workshop (Osei-Amponsah and Abdulai 2025). The workshop was conducted by the International Water Management Institute (IWMI) in collaboration with development planners and relevant stakeholders under the *Resilience Against Climate Change - Social Transformation Research and Policy Advocacy* (REACH-STR) project of the European Union Ghana Agriculture Programme (EUGAP). The Three Horizons (3H) Framework (Sharpe et al. 2016; Jordan 2021; Schaal et al. 2023) provides an effective structure for participatory scenario-building processes. This approach helps communities understand current challenges (Horizon 1), envision desired futures (Horizon 3), and identify transformative innovations and pathways (Horizon 2) that bridge them. It supports transformative learning, particularly for exploring climate action opportunities.

## Purpose of the guide

This guide provides a practical, step-by-step approach for practitioners to facilitate participatory scenario building focused on climate resilience. It aims to empower communities to understand their vulnerabilities, envision a resilient future, and identify concrete actions to achieve it, through the Three Horizons approach in community settings.

The guide is designed for community leaders, development planners, project managers, staff members of nongovernmental organizations, local government officials, and anyone involved in supporting community-level climate resilience initiatives. This guide introduces users to practical ways of conducting climate vulnerability analyses. It then discusses the six phases of participatory scenario planning, guiding you through understanding the context, facilitating the participatory process, and developing actionable plans.

## Three steps of participatory scenario planning

### I. Understanding climate change impacts and vulnerabilities

#### *Localizing climate change information*

Effective climate resilience planning requires understanding climate change trends and their context-specific manifestations.

- Begin by gathering and understanding climate information relevant to your specific community. This includes historical data on temperature and rainfall, as well as future climate projections from reliable sources (e.g., national meteorological agencies, scientific reports). Analyze how these changes are likely to manifest locally (e.g., increased frequency of droughts, changes in growing seasons, more intense rainfall events).
- Facilitate a community discussion to document the current impacts of climate change already being experienced. For example: rising temperatures affecting crop yields and livestock health; unstable and unpredictable rainfall leading to water scarcity and agricultural losses; increased deforestation exacerbating land degradation and reducing natural buffers. Present this information in accessible formats that participants can easily understand, using visual aids, simple language, and local examples whenever possible.

#### *Conducting participatory vulnerability assessments*

- Conduct a participatory assessment to identify who are the most vulnerable (e.g., women, children, farmers, persons with disabilities, the elderly, resource-poor smallholder farmers) to the identified impacts and why. Factors to consider include:
  - **Exposure:** How directly are people and assets affected by climate hazards?
  - **Sensitivity:** How much are they affected when exposed? (e.g., reliance on rain-fed agriculture makes farmers highly sensitive to rainfall changes)
  - **Adaptive capacity:** What resources and abilities do they have to cope with and adapt to the impacts of climate change? (e.g., access to irrigation, financial resources, knowledge of alternative farming techniques)
- Connect the impacts and vulnerabilities by analyzing the relationships between specific climate change impacts and the vulnerabilities of different groups and sectors. For instance, reduced rainfall directly impacts farmers reliant on rain-fed agriculture (high sensitivity), especially those with limited access to water storage or drought-resistant seeds (low adaptive capacity).

To put vulnerability assessment into practice, we propose the Vulnerability Assessment Matrix (Figure 1). This matrix helps to systematically evaluate how sensitive different sectors—such as agriculture, water, health, and infrastructure—are to the impacts of climate change. It helps stakeholders to collectively identify which groups are most affected, assess their capacity to adapt, and assign priority levels to them for intervention development.

Sector	Climate (Exposure)	Affected Groups	Sensitivity	Current Adaptive Capacity	Vulnerability	Priority Level
Agriculture						
Water						
Health						
Infrastructure						
Livelihoods						
Energy						

Figure 1. Vulnerability Assessment Matrix.

The Participatory Capacity and Vulnerability Analysis (PCVA) can also be used to identify and document climate vulnerabilities (Ahmed et al. 2012).

## II. The participatory scenario-building process using the Three Horizons Framework

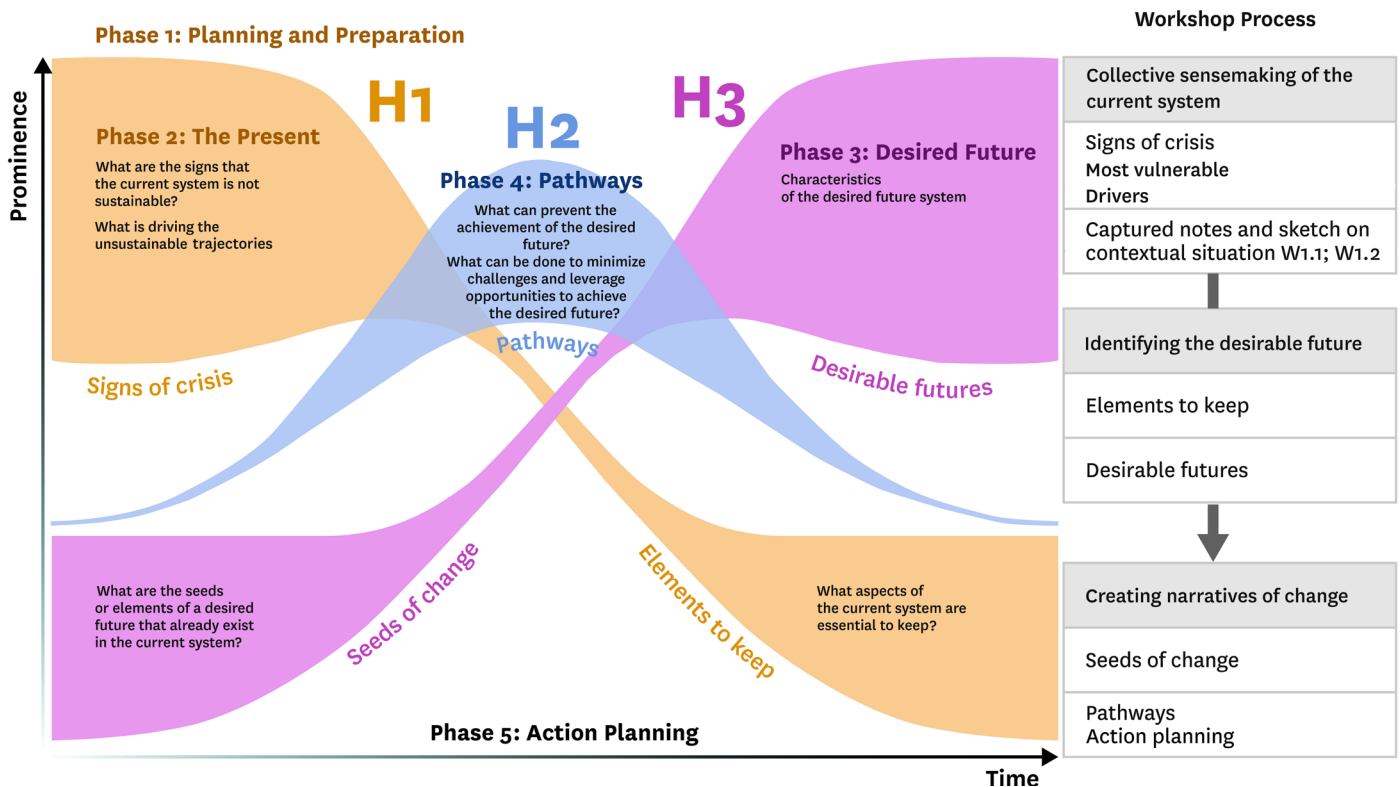
The Three Horizons (3H) Framework (Schaal et al. 2023) helps structure our thinking about the present, the emerging future, and the desired future (Figure 2). It is a foresight tool that helps participants to recognize that transformation happens over time through a series of incremental and systemic changes. The framework is structured as follows:

**Horizon 1 (H1):** Examining current systems, challenges, and practices that may be increasingly unsuitable for changing climate conditions

**Horizon 3 (H3):** Envisioning desired future states where communities have achieved climate resilience

**Horizon 2 (H2):** Identifying transitional innovations, actions, and pathways that help move from present challenges towards future resilience

The participatory scenario-building process can be conducted in a two-day workshop setting. The first day can focus on analyzing climate vulnerabilities, Horizon 1, and Horizon 3. The second day can be dedicated for Horizon 2 and action planning.



**Figure 2.** The Three Horizons approach to participatory scenario planning.

Source: Based on Schaal et al. 2023

### Phase 1: Planning and preparation

- Define the scope and objectives - clearly define the focus of your scenario-building exercise. Define what aspect of climate resilience you will focus on (e.g., water security, agricultural livelihoods, infrastructure). Set clear objectives for the scenario-building exercise (e.g., to identify adaptation strategies for the agricultural sector under different climate futures). Also consider: geographic scope (e.g., community, district, watershed, etc.); sectoral focus (comprehensive or targeting specific sectors); timeframes (short-term and long-term planning horizons); and specific objectives and expected outcomes. For example, “*This scenario-building exercise will focus on strategic interventions that enable smallholder cereal farmers in Ghana’s Nalerigu District to adapt their agricultural livelihoods to the increasing frequency of prolonged droughts in the short to medium term.*”
- Identify and engage stakeholders – successful participatory processes require diverse representation. Conduct a stakeholder

- analysis to identify: community members from different social groups such as local government representatives; technical experts and academics; members of civil society organizations; private sector actors; representatives from vulnerable groups; local leaders, sector experts, and other relevant actors. Ensure representation across gender, age, socioeconomic status, and other relevant dimensions of diversity. Plan how to ensure their meaningful participation based on the scope and objectives defined above.
- Logistics and resources - plan for an appropriate venue and setup; necessary materials (e.g., maps, flip charts, markers, sticky notes, visual aids, etc.); skilled facilitators; translation services if needed; documentation methods; food and refreshments; and budget and resource allocation.
- Allocate sufficient time for the process and establish clear guidelines for respectful and inclusive discussions.

## Phase 2: Exploring the current situation and trends (Horizon 1: The Present)

Horizon 1 represents “business as usual” – the current system with its challenges, vulnerabilities, and adaptation practices. Facilitating H1 discussions involves: documenting observed climate changes (e.g., rising temperatures, unstable rainfall patterns, etc.); identifying sectoral impacts (e.g., agriculture, water, health, etc.); mapping current adaptation strategies and their effectiveness; and analyzing the limitations of existing approaches.

- Facilitate discussions where participants share their current experiences with climate change impacts. Use open-ended questions to encourage detailed accounts.
- Collaboratively map the current systems and practices relevant to the chosen scope (e.g., current farming practices,

water management systems, energy sources). Identify what is working and what is not in the face of climate change.

- Discuss factors currently shaping the community’s vulnerability and resilience (e.g., population growth, land use changes, economic activities, existing policies).
- Identify vulnerable groups and understand factors contributing to their vulnerability; map existing adaptive practices and their effectiveness; analyze gaps in current adaptation efforts; and document community resources and assets that support resilience.

Use tools such as historical timeline exercises, seasonal calendars, community mapping, problem tree analysis, vulnerability matrices, and livelihood analysis.



Students at the Participatory Scenario-Building Workshop drawing what they regard as the current situation of practices in their community (photo: AKD Shares Unlimited for IWMI).

## Phase 3: Envisioning future scenarios (Moving towards Horizon 3: The Desired Future)

Horizon 3 represents the desired future in which communities have successfully built climate resilience. This vision should be ambitious yet plausible, and focused on positive outcomes rather than merely avoiding negative ones.

- Define time horizons – consider both a short-term timeframe (e.g., 5 years) and a long-term timeframe (e.g., 20 years) for envisioning the future.
- Facilitate group discussions to collaboratively envision a positive, climate-resilient future for each timeframe. Encourage participants to be specific and descriptive, focusing on the following strategic areas:

- **Environmental conditions:** What are the desired temperature and rainfall patterns? What is the state of natural resources such as water, forests, and soil?
- **Social well-being:** How are livelihoods sustained? What is the level of food security, health, and social equity?
- **Economic prosperity:** What are the key economic activities? Are they resilient to climate shocks?
- Articulate specific, measurable indicators of success, and consider how vulnerable groups will fare in this desired future.

Use techniques such as visioning exercises, future headlines, artistic representations, storytelling, drawing, or day-in-the-life scenarios to make visions tangible and compelling.

## Phase 4: Identifying pathways and actions (Connecting Horizon 1 to Horizon 3 via Horizon 2)

Horizon 2 represents the transition zone—innovations, initiatives, and pathways that bridge H1 and H3. These are emerging approaches that challenge the status quo and demonstrate potential for transformation.

- Backcasting from the desired future - for each timeframe, work backward from the envisioned desired future (Horizon 3) to identify the key pathways, strategies, and actions (Horizon 2) needed to get there from the current situation (Horizon 1). Ask: “What needs to happen along the way to achieve this desired future?”
- Discuss emerging technologies, practices, policies, and social innovations that could contribute to the desired future. These are the “seeds of the future” already present in the current context. Examples could include renewable energy technologies, climate-smart agriculture techniques, digital tools for climate information and early warning, and community-based adaptation initiatives.
- Identify how emerging innovations and trends (Horizon 2) can be scaled up and integrated into the pathways and recognize interconnections between the different pathways.
- Discuss what opportunities, challenges, and barriers might prevent the community from reaching its desired future.

- Brainstorm specific actions to overcome the identified challenges and barriers, and identify enabling factors that could accelerate change.

Use techniques such as storytelling, backcasting, innovation brainstorming, pathway mapping, obstacles and opportunities analysis, stakeholder commitment mapping, and visual documentation.

## Phase 5: Prioritization and action planning

- Develop criteria with the community to evaluate and prioritize the identified actions. Criteria may include feasibility, potential impact on resilience, cost-effectiveness, equity considerations and benefits for vulnerable groups, alignment with existing plans and policies, sustainability and long-term viability, and alignment with local values.
- For the prioritized actions, develop detailed action plans that include specific activities to be undertaken, responsible individuals or groups, timelines for implementation, required resources (financial, human, technical), and potential indicators of success.
- Use the Action Planning template (Figure 3) to guide the development of these action plans.

Action	Responsible Parties	Timeline	Resources Needed	Success Indicators

Figure 3. Action Planning template.

## Phase 6: Monitoring, evaluation, and adaptation

- Identify key indicators to track progress towards the desired future and assess the effectiveness of implemented actions. Key indicators should be linked to the success indicators and the timelines developed during action planning (Phase 5). These should be measurable and relevant to the community’s goals.
- Establish processes for regularly collecting data to observe how indicators are being achieved and for sharing the information with the community.
- Emphasize the importance of regularly reviewing progress, learning from successes and failures, and adapting strategies as needed based on new information and changing circumstances, and create mechanisms to incorporate new information.

collaborative environment. This section outlines key techniques and considerations to ensure your workshops are not only productive but also inclusive and equitable.

- Ensure the venue is accessible and comfortable for all participants.
- Ensure all participants feel comfortable contributing by establishing ground rules for respectful engagement, using inclusive language and approaches, creating opportunities for less vocal participants to contribute, addressing power imbalances within the group, and adapting methods to different learning styles and abilities.
- Ensure strong community ownership of the process and build on existing community structures and systems, emphasizing equity and inclusion of marginalized groups.

## III. Facilitation techniques for effective participation

A successful participatory scenario-building process hinges on effective facilitation that empowers all voices and fosters a truly

Capture discussions and insights using Three Horizons diagrams, influence maps, timeline visualizations, system maps, photo documentation, and digital storytelling (digital media production that allows everyday people to share experiences and stories).

## Case study: Applying the Three Horizons Framework in northwestern Ghana

A workshop held in Ghana's Upper West and Savanna regions brought together diverse stakeholders to envision climate-resilient futures using the Three Horizons Framework. The process demonstrated how this approach can be effectively applied to local contexts. The workshop combined group discussions with plenary sessions, where participants had the opportunity to highlight and elaborate on the key issues that emerged from the group discussions. The workshop was structured into sessions, with two sessions held each day.

The stakeholders who took part in the workshop included regional coordinating officers; municipal or district coordinating officers; traditional leaders; researchers and academics; representatives from government ministries, departments, and agencies; development partners; agricultural project managers; farmers; students from primary and secondary schools; members of farmer-based organizations (FBOs), nongovernmental organizations (NGOs), and civil society organizations (CSOs); private sector representatives; youth groups; and women's groups.

On the first day, participants discussed signs of crisis within the current system, elements to keep, a desirable future, and seeds of change. The following questions and prompts guided the discussions:

**Current crisis:** What changes have you observed in your communities over the past 30 years? How is climate change (i.e., changes in rainfall, temperature, etc.) affecting you, your households, and your community? (*Probing focused on potential effects in the agriculture, health, water, sanitation, transportation, and industry sectors*) Which groups are more vulnerable to the adverse effects of climate change? How are you, your household, and your community adapting to or coping with climate change? What are the signs that the current adaptation/coping mechanisms (for the various sectors) are not viable in the long run (for example, by 2030)? What drives the unsustainable trajectories of the current system?

**Elements to keep:** What aspects from the current system would you like to retain, and why?

**Desirable futures:** Participants were tasked with identifying characteristics of a desirable future (for 2030 and 2050), as well as the possible drivers or enablers of that desirable future, and potential barriers to achieving it.

**Seeds of change:** Identify current innovations/practices/technologies that support a climate-resilient desirable future.

The focus of the second day of the workshop was to develop pathways (Horizon 2) for bridging the gaps in the current system (Horizon 1) to achieve the desirable characteristics of the future (Horizon 3). The participants discussed:

1. What can prevent them from achieving the desired future?
2. What can be done to minimize the challenges that could prevent the achievement of the desired future?

The second session of the second day was used to discuss the key issues that emerged from the group discussion.

### Horizon 1 Findings:

**Current challenges:** Rising temperatures, unstable rainfall, low crop yields, increased deforestation

**Sectors impacted:** Agriculture, water, sanitation, health, transportation

**Vulnerable groups:** Women, children, farmers, persons with disabilities, the elderly, health workers

**Existing adaptation strategies:** Agroforestry, improved crop varieties, conservation agriculture

### Horizon 3 Vision:

**Short-term (2030):** Lower temperatures, stable rainfall, improved water sources, decreased deforestation

**Long-term (2050):** Effective climate change policy, commercial agriculture, healthy labor force

### Horizon 2 Pathways:

Private sector participation in organic fertilizer production; deliberate use of organic fertilizers; development of irrigation infrastructure

**Barriers:** Limited funding, corruption, poor governance

**Enablers:** Public education and awareness, increased climate financing, reduced corruption

## Conclusion

Participatory scenario building, guided by frameworks such as the Three Horizons, offers a powerful approach to empower communities to proactively address the challenges of climate change. By collaboratively envisioning desired futures and identifying pathways for transformation, communities can build ownership over resilience strategies,

leading to more sustainable, equitable, and locally relevant outcomes. This manual provides a starting point for this crucial journey.

By integrating the Three Horizons Framework, this guide provides a structured approach for communities to not only understand their current climate challenges but also to envision and plan for a more resilient future by considering emerging trends and desired outcomes.



A woman irrigates her maize farm with her daughter in Ada, Ghana (photo: Nana Kofi Acquah).

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## Project

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