

# Embedding climate services in coffee smallholder realities – a broadened conceptual framework for effective interventions

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01.

## Background – Noise in the ears of farmers

- Climate change is a process. Adapting to it requires recurring adjustments. Too often, though, interventions only focus on tick-box solutions.
- Smallholders combine multiple crops on their farm, occasionally even combined with temporary or permanent off-farm income. Each process has its own temporality, that is timing of activities throughout weeks, months, decades.
  - Coffee, for example, needs 3 to 5 years until it bears its first fruits, should be pruned every seven to ten years, and is ideally renewed after around 20 to 30 years – but overaged trees are a commonly found in smallholder farms around the globe.
- Climate change expresses itself in long-term shifts (e.g. changing annual mean temperatures) and increase in frequency and severity of climate extremes. Both are important dimensions that farmers need to adapt to.

## Why does this matter? – Ensuring global coffee supply or local income opportunities?

- Failing to account for on-farm temporalities and off-farm constraints severely limits farm-innovation adoption rates.
- Non-aligned climate services are noise that never reaches the farmer.
- Climate adaptation interventions are not power agnostic. Where this is ignored, interventions may be at odds with alternative livelihood goals of farmers; e.g. ensuring global coffee supply for coffee roasters vs. transitioning to alternative income opportunities.

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## Methods – Inner reflection & literature engagement

We used a farm-centric perspective to critically engage with the climate adaptation literature and our experience and practice in research-for development projects, accounting for more than 30 years of experience with smallholder coffee systems around the globe.

Guiding questions were:



- How do the temporalities of adaptation options align with the income fluctuation and long-term perspectives of coffee farmers?
- Whose interests are prioritized when rolling out climate adaptation projects amongst coffee farmers; how is power and decision-making distributed?
- How can the adaptation process and related climate information services be better structured to more holistically support the farmers and their families?

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## Conclusions – Being sensitive to farm realities

- Climate adaptation innovation offerings and services need to be embedded – or more precisely: fitted – in the farmer's agro-ecological context and livelihood aspirations.
- Climate services need to be explicit in regards to which farming activity they aim to inform, and how corresponding climate adaptation processes relate to different on-farm temporalities.
- In a coffee value chain characterized by global power asymmetries, a livelihood- and farm-centered approach can help identify pathways towards more equitable outcomes for producers.

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## Findings – Unpacking climate adaptation planning in the context of coffee farms.

- Climate resilience consists of the capacity to absorb, adjust and/or transform the impacts of climate change. Climate adaptation interventions commonly aim to strengthen one or several of these capacities. The preference regarding which capacity to target may differ across actors, though. (Grabs et al., 2026)
  - Roasters may be looking for global supply stability, whereas some farmers may be better served with increasing their transformative capacity of changing the market structure.
- Activity planning on coffee farms spans operational planning, tactical decision making and strategic planning and can be related to corresponding farm activities and climate signals. (Giraldo et al., 2023)
- Business-operationalized action frameworks for climate adaptation would combine the ability to react and maintain operations under sudden shocks with proactive planning for long term shifts. (Hennes & Löschel, 2024)

Under smallholder coffee farming realities, multiple temporalities are then touched upon, increasing the complexity of planning and decision making. These include farm activities in:

- Complementary annual crops (cover crops, additional food crops).
- Multi-annual crops (temporary shade, cassava or banana/plantain farming).
- Perennial crops on the farm (esp.: shade trees).

In addition to that, yearly school fees of children and off-farm income opportunities (including temporary migration) and long-term considerations such as farm succession.

Fig. 1 Integrating climate adaptation in smallholder farmer decision-making

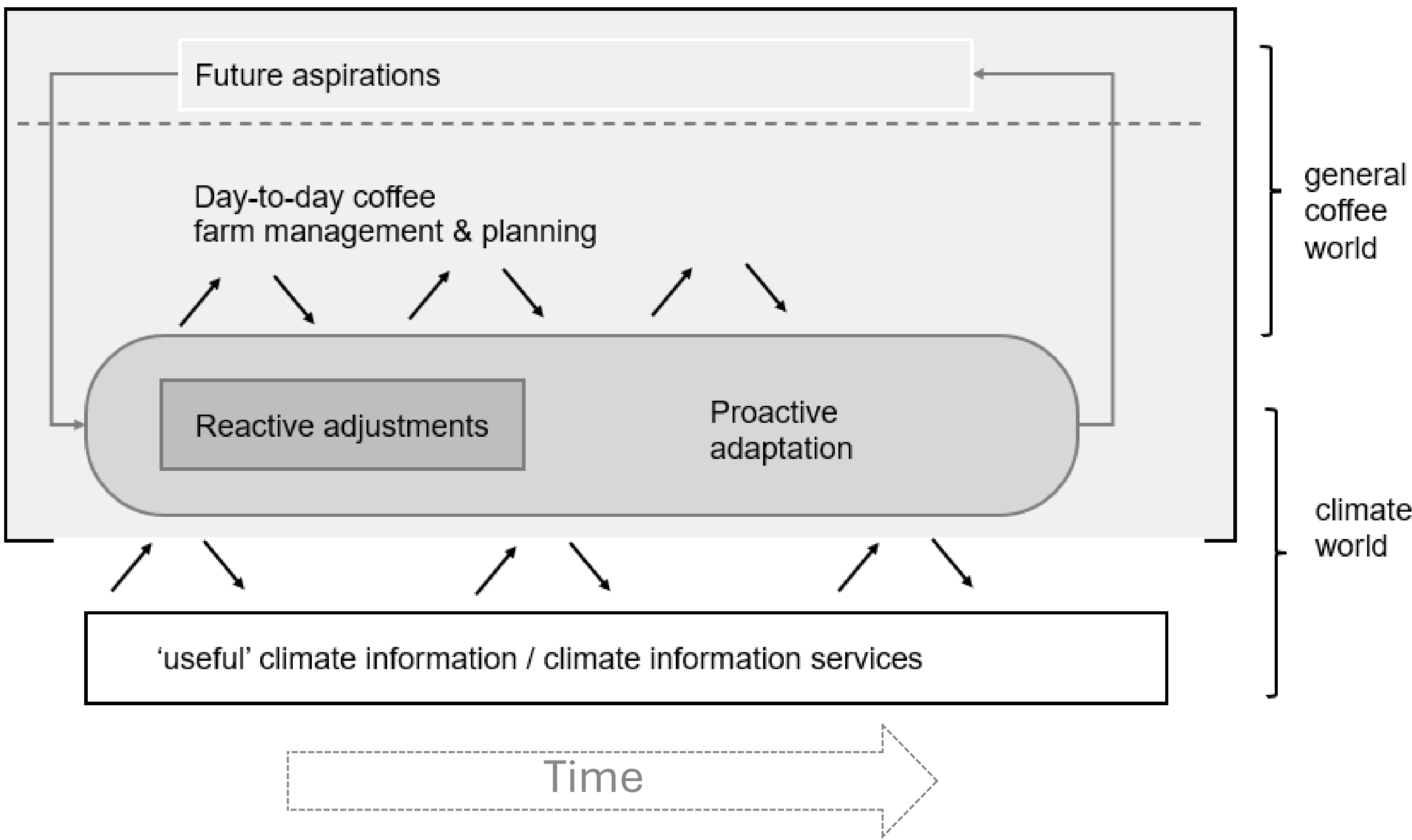


Fig. 1: Overlapping temporalities in coffee-related climate adaptation processes, as well as the planning-relevant dimensions of climate change adaptation. Desired responses embrace both, the ability to react to extremes and the proactive adaptation to shifting mean values while ultimately contribute to all three resilience-relevant capacities of absorptive, adaptive and transformational resilience.

