

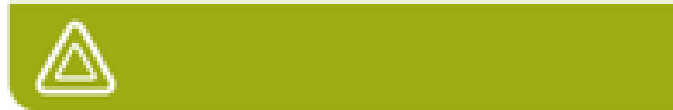
Defining and operationalizing path dependency for planning integrated disaster risk management at the municipal level

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<https://pathways.joanneum.at/>

Background

- Recent extreme hydro-meteorological events clearly show that the challenges posed by climate-related risks demand well-informed and –prepared local governments.
- Disaster risk management decisions and their impacts are typically assessed as singular events, often overlooking the locally specific socioeconomic framework conditions and ignoring alternative paths and decisions.
- Adaptation pathway approaches (APA) have become an increasingly popular means of facilitating local and regional anticipatory planning under climate change.
- Path dependency is a frequently mentioned concept in the context of adaptation pathways specifically and institutional analysis more broadly. However, it is insufficiently defined and thus of limited use in improving decision making under uncertainty.

Objective

- In the Pathways project we systematically translated the path dependency concept as part of adaptation pathways approaches into a conceptual framework operational and applicable to flood risk management.
- We tested this concept in two empirical settings: (1) semi-structured interviews with key actors of flood risk management in the Enns and Aist river regions in Austria. (2) a two-stage workshop for climate risk management at the municipal level, integrating and building on the Austrian Naturgefahrencheck.

Analyzing adaptation pathways and path dependency

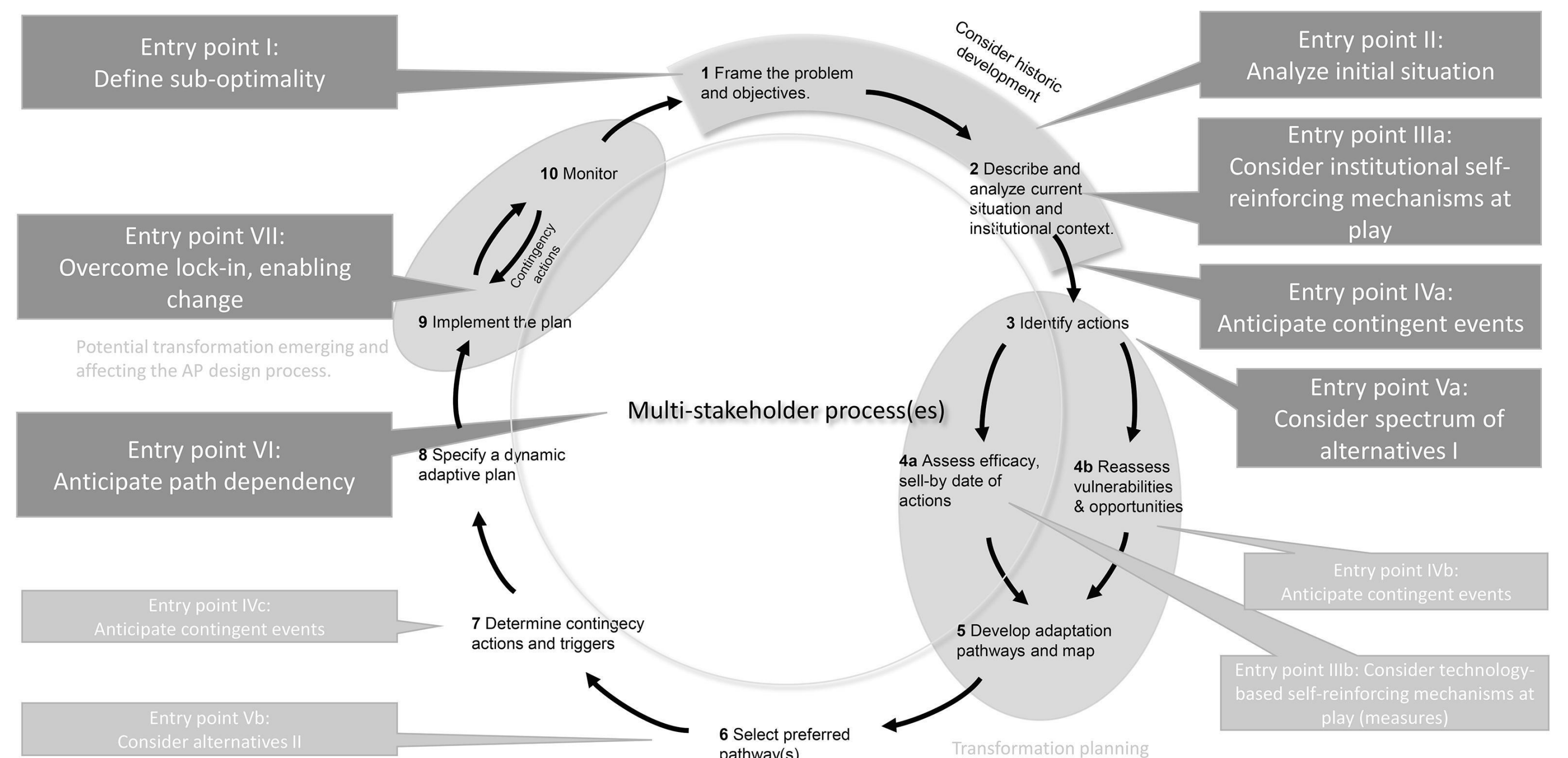
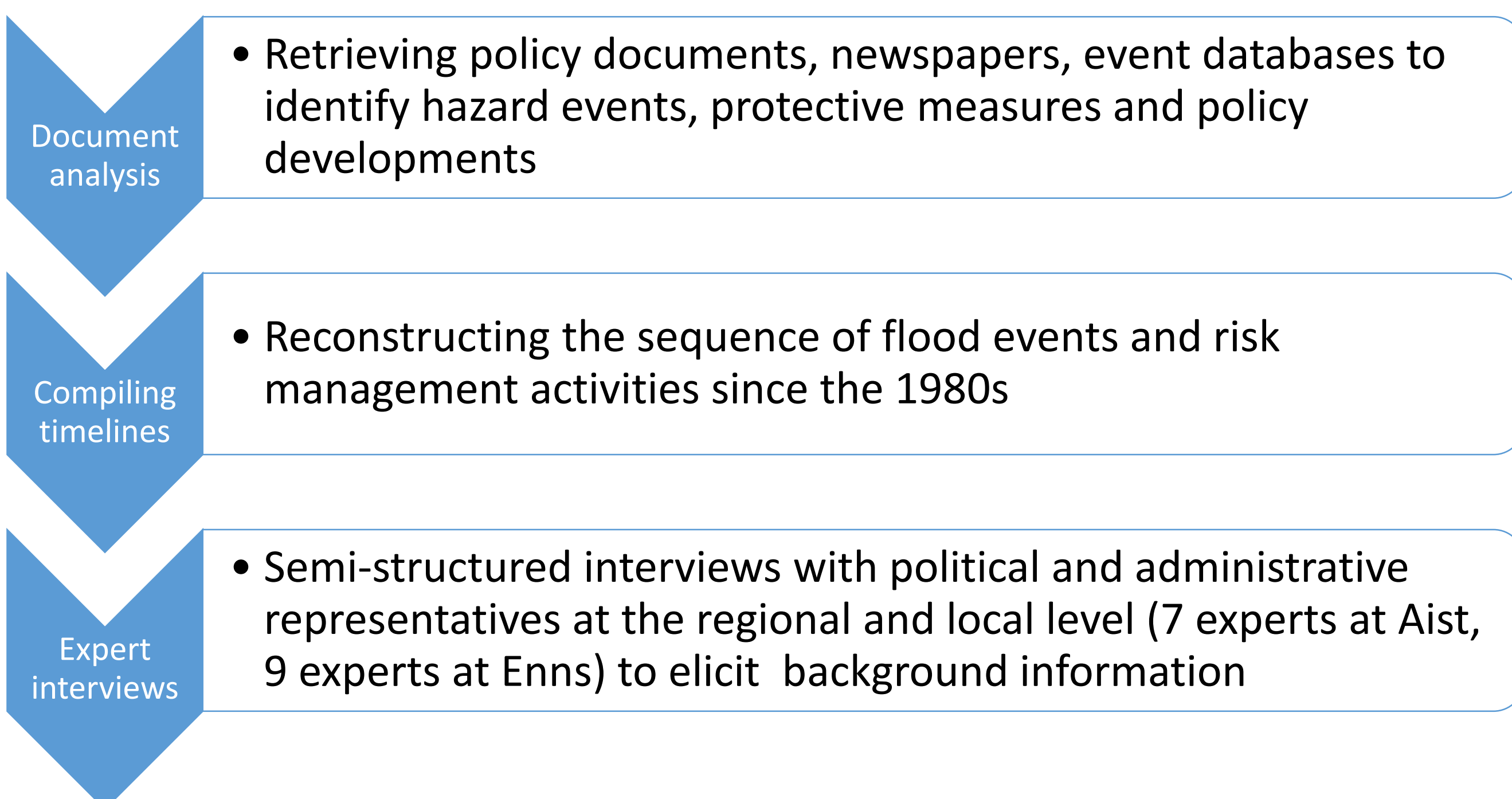


Figure 1: we build on and expand the adaptation pathway approach (Haasnoot et al. 2011 and 2012). The main improvements are the addition of a backward-looking perspective (on past decisions) and a comprehensive link with path dependency theory. (Source: Hanger-Kopp et al. 2021)

Setting 1: Interviews



Element of path dependency	Manifestation in the case study regions
Lock-In A phase of stability characterized by, at most, minor and incremental change and no or little chance of endogenous change.	Management paradigms represent persistent mindsets and practices how recurrent FRM-related decisions are taken: <ul style="list-style-type: none"> Preference for large-scale structural measures Municipal authority for land zoning Perpetuating tried-and-tested approaches
Sub-optimal outcomes A trajectory undercutting optimal (e.g. a policy target to be reached) or efficient (e.g., a given ratio between costs and benefits) outcomes.	<ul style="list-style-type: none"> Faulty or inadequate implementation Piecemeal or incremental measures alleviating the currently most urgent point of concern Delay in realisation of measures Ambiguous protection targets and residual risk Unclear prioritisation of policy targets
Contingent events The cause of a path dependent trajectory. Contingent events are stronger than the initial situation and context of a development.	<ul style="list-style-type: none"> Flood events challenged but never overstretched the current risk management capabilities Flood events often direct attention to hot spots Technological turning points: revised hazard maps, availability of digital maps Institutional turning points: legal (mostly EU) obligations, networking projects
Self-reinforcing mechanisms Positive feedback or increasing returns that ensure the continuity of a path.	Technology based: <ul style="list-style-type: none"> Interdependencies/complementarity: Catchment hydrology, managing of cropland and forests Adaptive expectations: sticking with or questioning earlier risk projections High up-front costs, economies of scale: maintenance costs of structural measures Institution-based: <ul style="list-style-type: none"> Collective goods: mobilisation of private land, upstream-downstream deadlock Institutional density: voluntary outsourcing of mayors to technical experts and regional administration, closed-off administrative procedures and jurisdictions Political authority: dominant role of the administration, exclusive and intransparent decision processes
Triggers and conditions for change	<ul style="list-style-type: none"> Emergence of policy entrepreneurs Availability of additional or flexible financing Small-scale experiments with alternative FRM approaches Regional actor coalitions

Setting 2: Workshops

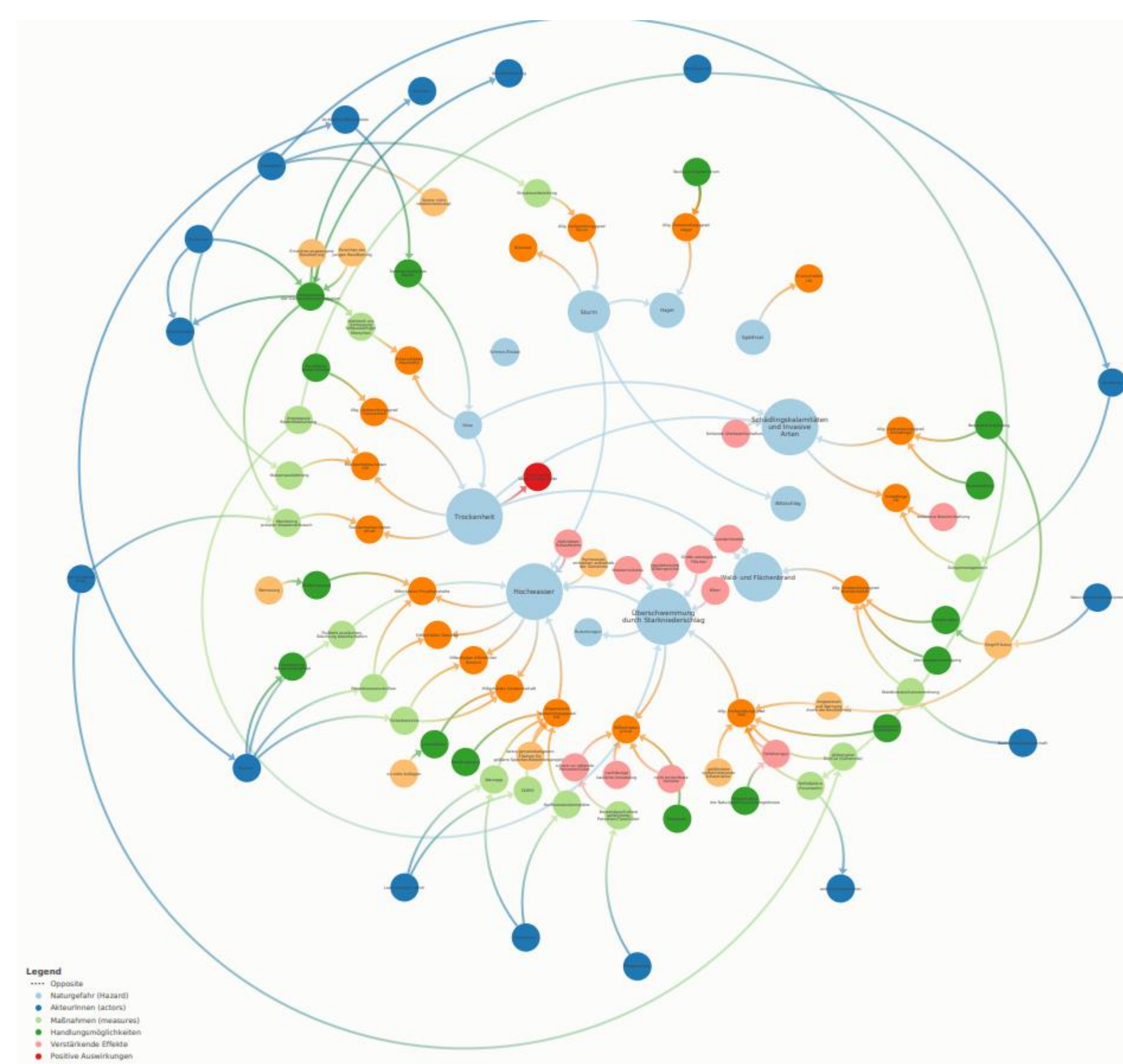
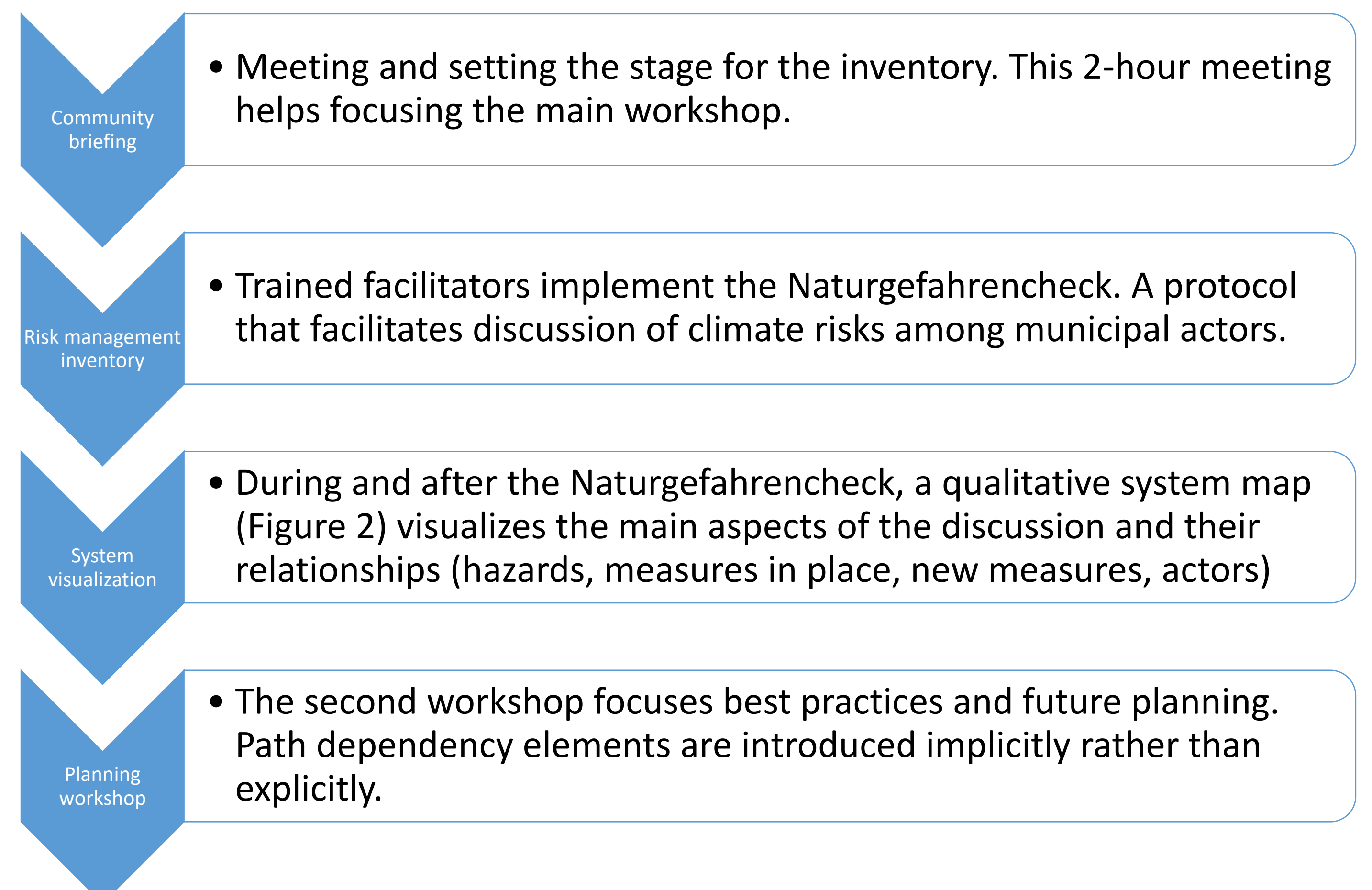


Figure 2: qualitative system map of the Naturgefahrencheck in the municipality of Kefermarkt.

- Qualitative system maps are a useful tool to illustrate current disaster risk preparedness and response capacities.
 - They have yet to be developed to highlight potential path dependencies explicitly.
- The Pathways process is very well suited for directing the stakeholders' awareness to the initial situation, identifying/anticipating contingent events, and recognizing self-reinforcing mechanisms.
 - However, co-producing detailed pathways requires time resources that go beyond the scope of this project and that of many stakeholders.

Conclusions

- How future flood risk will develop is highly uncertain due to the complex interaction of climatic drivers. Any current decisions with respect to future flooding have to account for this uncertainty, and thereby enable future decision-making that is flexible enough to accommodate changing circumstances.
- Past decisions may also limit or enable FRM decisions in the present and future. We suggest to apply this path dependency lens also in other applications of adaptation pathways such as water scarcity/drought risk management, forest disturbance or landslides management.

References:
 Haasnoot, M., Kwakkel, J. H., Walker, W. E., & ter Maat, J. (2013). Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world. *Global Environmental Change*, 23(2), 485–498. <https://doi.org/10.1016/j.gloenvcha.2012.12.006>
 Hanger-Kopp, S., Thaler, T., Seebauer, S., Schinko, T., & Clar, C. (2022). Defining and operationalizing path dependency for the development and monitoring of adaptation pathways. *Global Environmental Change*, 72, 102425. <https://doi.org/10.1016/j.gloenvcha.2021.102425>