



Anticipatory Learning for Climate Change Adaptation and Resilience



Introduction: Who, What, and Where

We are looking at adaptive capacity using the concept of **anticipatory learning**, or learning about the future before impacts are apparent. We are interested in how communities respond to impacts of climate change, and how **iterative social learning** may enhance people's capacity to make **flexible decisions** in the face of **uncertainty**. We are working in eight communities in Ghana and Tanzania.

Funding: National Science Foundation (Human and Social Dynamics)

Team Members:

Penn State University, USA: Dr. Petra Tschakert (PI), Dr. Robert Crane, Dr. Simon Hooper, Dr. Esther Prins, Dr. Ken Tamminga, Dr. Jen Shaffer, Kathleen Dietrich, Maureen Biermann, Eleanor Andrews, Shannon Frey, Kimeka Campbell, Zhuo Chen, Jacquelyn Gagnon, Melissa Harkavy, David Knoppers, Dun Ning, Rebecca Roth, Lauren Rubin, and Jen Spinelli; **Afram Plains**

Development Organization, Ghana: Awudu Y. O. Modoc, Nuhu Umar, Timothy Obideabah, Paulina Apaadey, Grace Achisah; **Red Cross Society, Tanzania:** Julius

Kejo, Neema Masomo, Lucy Swai; **University of Dar es Salaam, Tanzania:** Dr. Pius Yanda, Dr. Emma Liwenga, Philipina Moshi, Anselm Silayo, Madaka Tumbo, Lucia Alphin; **University of Ghana, Ghana:** Rev. Dr. Elias Asiamah, Dr. Alex Asiedu, Yaw Agyeman Bofo, Winfred Oteng; **University of Cape Town, South Africa:** Dr. Bruce Hewitson; and most importantly, committed community members from Ghana and Tanzania.

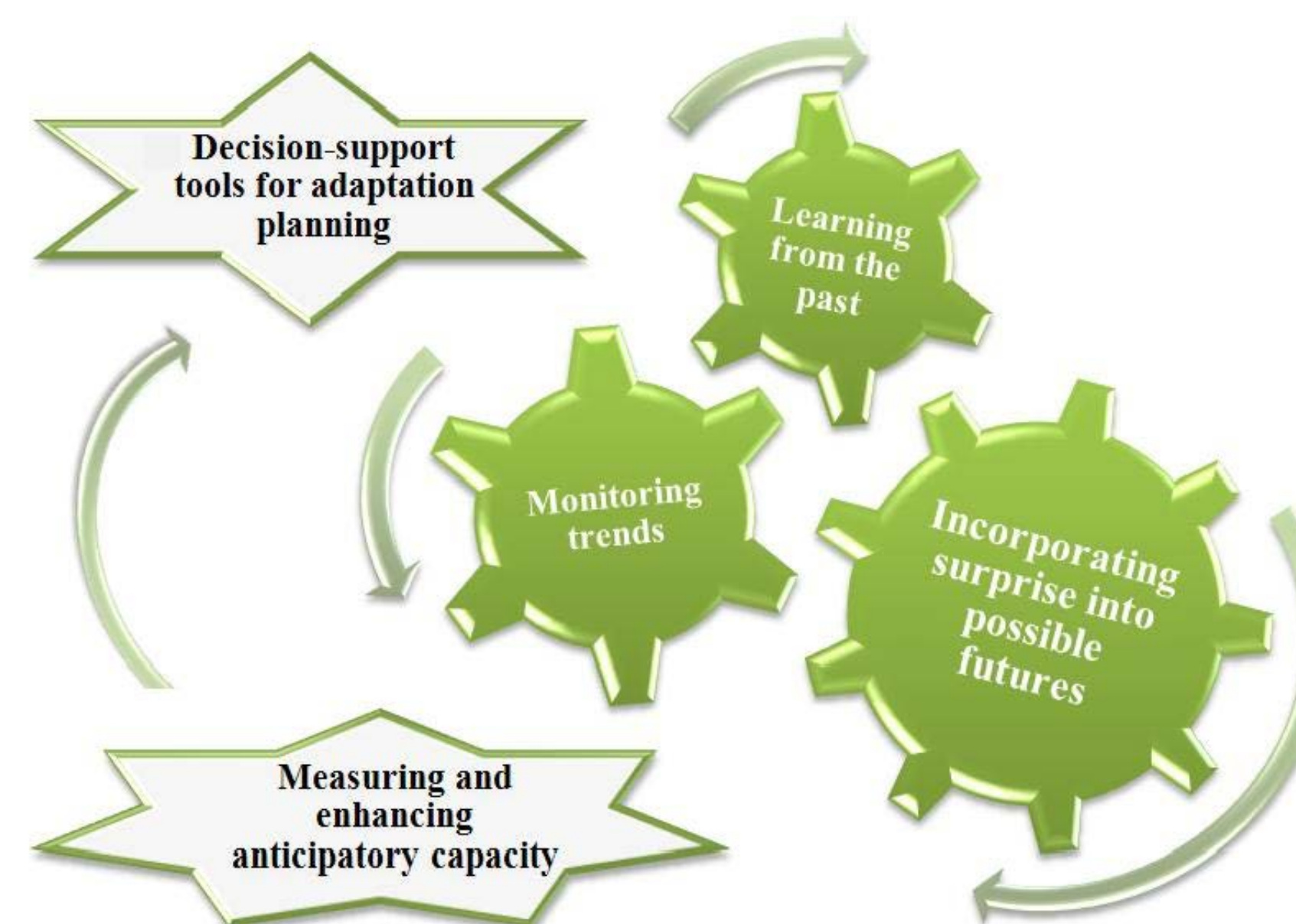


Adaptation: Conceptual Framing

Adaptation is a vital entry point to enhancing the **capacity** of the most vulnerable individuals and groups in the face of **climatic change and uncertainty**. However, we know too little about the **decision making processes** that shape adaptation and resilient livelihoods:

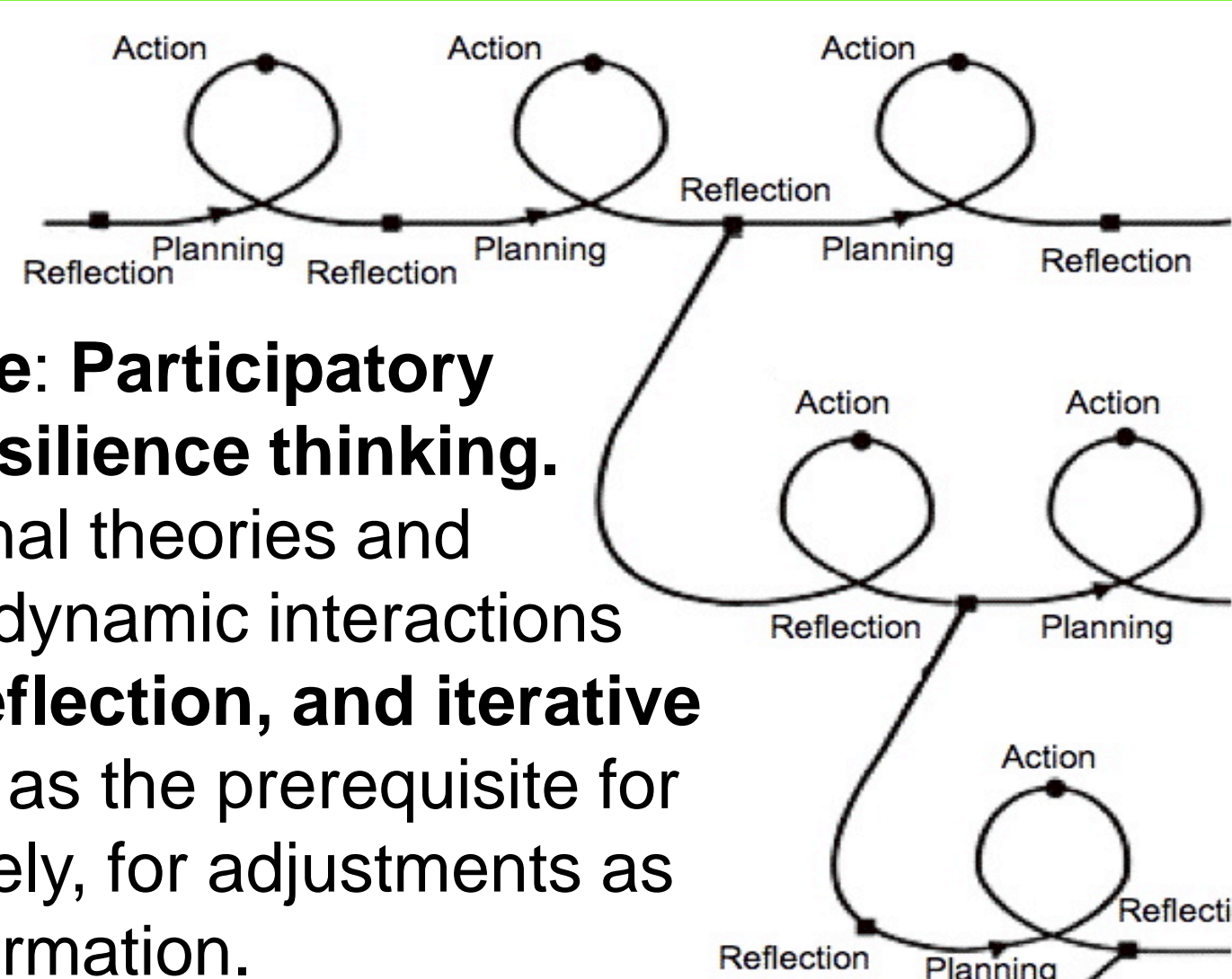
- The current debate focuses **too much on responding to the predicted climate change impacts**, rather than **addressing the underlying factors** that shape vulnerability and adaptation action.
- Existing methods do little to initiate and sustain **adaptive and anticipatory learning**, especially at the community level.

Our methodological framework stresses an **iterative way of learning** about uncertainties and changes by viewing adaptation as a **socio-institutional process** with **cycles of anticipation and responses** to multiple stressors.



Anticipatory Learning in CC Adaptation: Theoretical Frameworks

We identify **two theoretical frameworks** that address learning processes from a **dynamic systems perspective: Participatory action research (PAR) and resilience thinking**. By also drawing from educational theories and landscape and place, we view dynamic interactions between **memory, nodes of reflection, and iterative learning and re-performance** as the prerequisite for anticipatory action and, ultimately, for adjustments as well as (radical) system transformation.

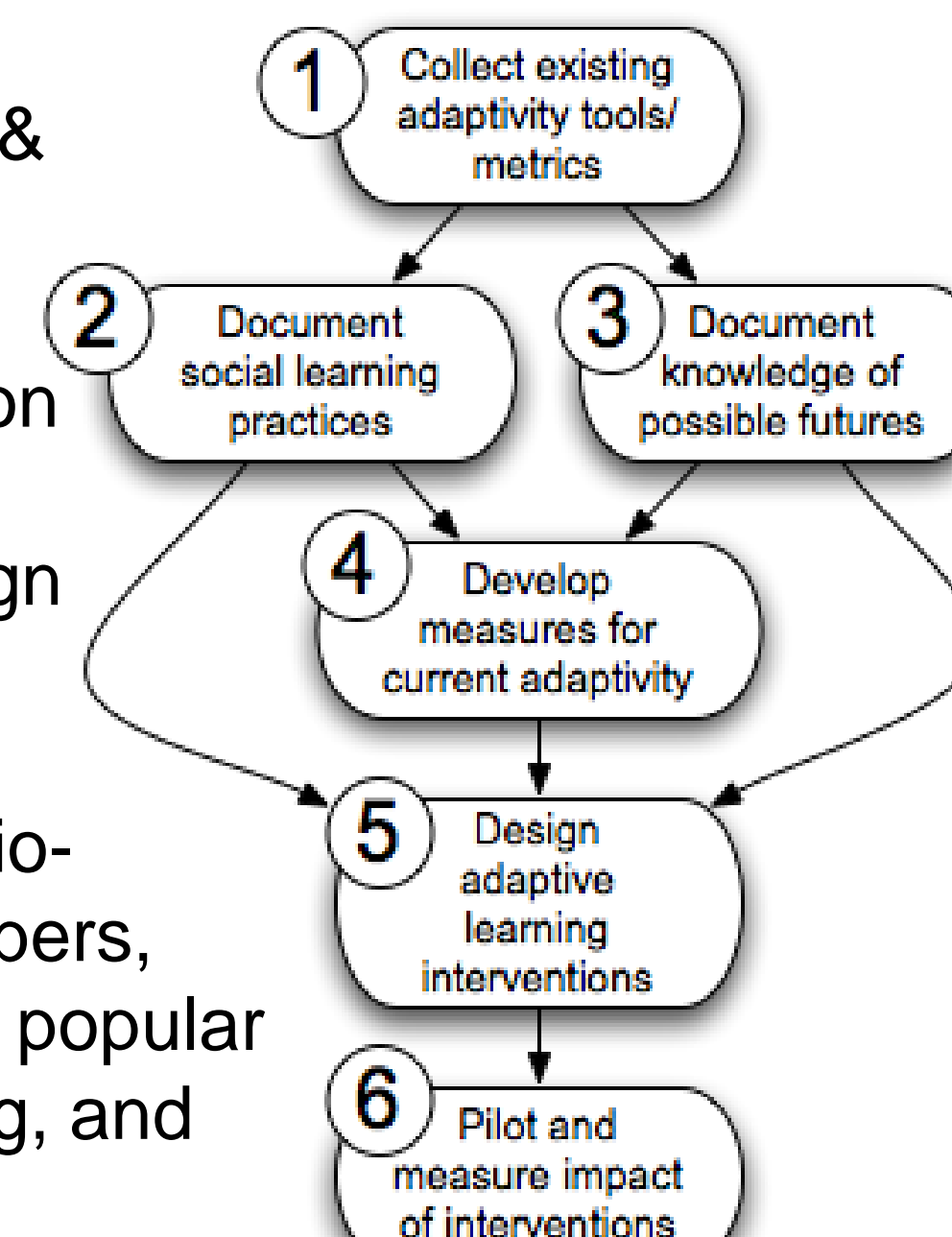


These insights from complex cycles and PAR reveal **three major challenges for anticipatory learning in climate change adaptation:**

- How do we acknowledge and incorporate uncertainty and surprise in an iterative social learning process built upon a systems view?
 - Pay attention to slow changing variables
 - Envision rapid changes with potentially catastrophic shifts
- How do we learn from past events/actions to anticipate the future?
 - Be attentive to accumulated knowledge
 - Explore potentials for renewal and reorganization
- How do we validate different types of knowledge and address power imbalances among multiple and diverse groups of stakeholders?
 - Acknowledge within and between-group inequalities
 - Consider different climatic understandings

Methodology: Iterative Cycles

- 1 Literature review and evaluation of learning tools
- 2 Baseline on anticipatory learning: ranking risks and uncertainties, mental models of driving forces of change, focus groups on existing tools, interviews and surveys on social capital and sources of information on climate change, walking journeys
- 3 Scenario building for the future: drawings & written storylines
- 4 Interviews on planning & climate adaptation
- 5 Interdisciplinary graduate seminar to design anticipatory learning tools
- 6 Testing an anticipatory tool prototype: socio-ecological monitoring by community members, role-plays with selected climate elements, popular environmental theatre, community meeting, and layered mapping of ideas for the future



Learning: Past, Present, and Future

We used a **baseline on anticipatory learning** (#2 & #4) to assess the effectiveness of later anticipatory learning tools.



Walking journeys showed how community members perceive changes in their landscape over time, the pace of these changes, and individual and collective learning and decision making in response to these changes.

Using the metaphor of a spider web, **spidergrams** helped participants see the “holes” in their community “webs,” where they could improve their effectiveness in preparing for the future.

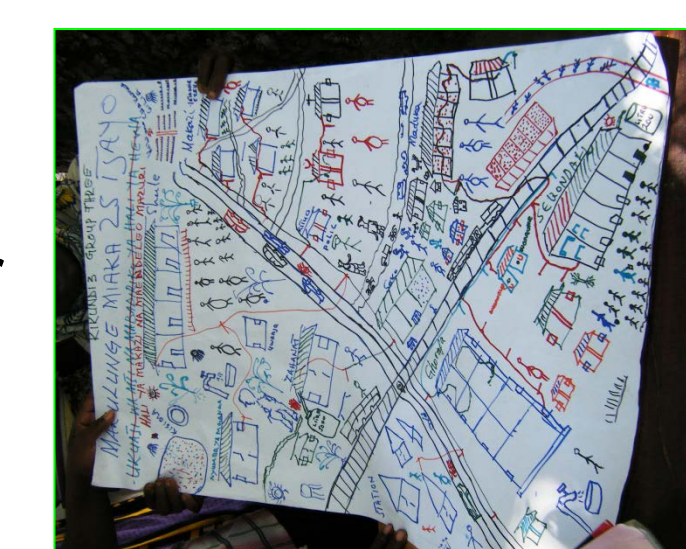


Participants discussed past **driving forces of change** to anticipate and prepare for the future, by thinking about the origins, pace, direction, ability to control, and interconnectedness of critical factors.

Interviews on planning and climate adaptation showed differences among Ghanaian and Tanzanian communities as participants rated their personal and collective preparedness.

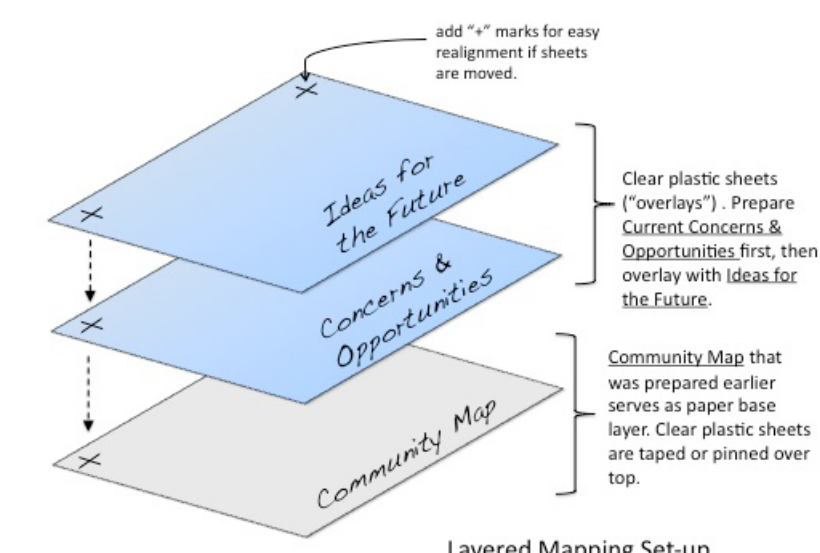
The **learning tool** was comprised of interconnected activities (#3 and #6).

In **scenario building**, groups explored climatic and non-climatic drivers of change to envision several creative but plausible storylines for their community in 2035, combining desirable and undesirable elements in future trajectories.



Community monitors led **socio-ecological monitoring** by gathering data on selected climate (temperature and rainfall) and other sectors (e.g., animal health and erosion) to share with their communities.

Role-plays and environmental theatre were an engaging way to foster change in thinking and behavior. Actors and audience members together explored needed tradeoffs and planning steps for negotiating resilient and fair future pathways.



Layered mapping is an initial step in learning to plan and build adaptive capacity in the face of uncertainty. Participants collaborated to draw their concerns/opportunities and ideas for the future, over a base map of the community.