

Dynamic climate adaptation – A research approach in Taiwan

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Global climate change is an ongoing trend which has already had an impact on human society. As far as anthropogenic climate change is concerned, it can be designated a societal problem. The relationship between climate and society has always been dynamic. Both climate change and its impact are still highly uncertain due to our limited knowledge of the interaction between the earth and human systems, even though we are being asked to adapt to climate change.

Accordingly, climate change adaptation has become a new research field that requires cross-disciplinary collaborative efforts between natural and social sciences. A new “dynamic” approach needs to be built in a systematic manner that will allow us to effectively and efficiently respond to climatic impact. This cross-disciplinary approach plays an essential role in climate adaptation research. Disaster risk, with an emphasis on risk management, is also needed for advance climate adaptation in countries like Taiwan, at high risk for natural hazards. We need to be aware that climate change has a direct effect on hazard risks.

However, a comprehensive concept of adaptation in the face of climatic uncertainty is still lacking, even given the importance placed on impact assessment. Therefore, the National Science Council (NSC) of Taiwan has initiated a research project promoting climate change adaptation technology (CCAT). The objective is to develop a cross-disciplinary climate adaptation prototype that is methodologically capable of dealing with uncertain climatic impacts and assisting the public and private sectors in Taiwan to develop adequate adaptation technologies on the one hand, and to foster national sustainability on the other hand. Thus, the CCAT is a nationally initiated project designed to reflect on the human influence on climate, and indicates a marked paradigm shift in the policy debate.

This scientific encouragement by the NSC has fostered the interest of our research team in conceptualizing a research approach for climate adaptation, which is discussed in this paper. This approach is based on the understanding that climate change is forcing Taiwan to create timely scientific methods for adaptation technology for which an interactive process between emerging information and evolving experience is needed. Dynamic Climate Adaptation centered on integrating resources and innovative activities is thus addressed. In other words, interactions between disciplines must be highlighted in the sense of transdisciplinarity. It is expected that this approach will be helpful for science and society to work out adaptation strategies together, as well as to facilitate the synergy among natural sciences, social

sciences, and humanities in the context of sustainability.

Methodologically, the regional approach is the key for conducting CCAT, since climatic impacts vary regionally and given the geographic diversity in Taiwan - a place where the mountains meet the sea. Through the regional approach, external interactions are established to link national and regional levels for supporting political decision making, whereby nationally initiated (top-down) policies set explicit aims and objectives that are directly translated into action on the ground, while the regional approach (bottom-up) recognizes the importance of other actors in shaping policy integration. The regional approach is comprised of three working groups, Environmental system Analysis (EA), Vulnerability Assessment (VA), and Adaptation Planning (AP), established for internal interactions in the form of various sub-projects given in both functional and spatial contexts. It is expected that relevant theories and tools related to climate change and adaptation will be developed in the functional context as support for the outcomes in the form of practices and findings, which in the spatial context are referred to in “climate-sensitive” regions in urban, rural, mountain, river-basin, coastal, and offshore island areas, for identifying key adaptation issues.

Essentially, the internal interaction of CCAT is based on the understanding of a causal relationship between climate change and adaptation. Herein, it is crucial to understand how to interpret climate change, vulnerability, and adaptation (CVA) clearly. It is necessary to look at their causal relationship in detail, and to obtain a general understanding in order to take adaptive action in anticipatory, autonomous, and planned manners. The Drivers – Pressures – State – Impact – Response (DPSIR) causal framework used by the European Environmental Agency (EEA) is applied in this work, with the focus on the linkage between DPSIR. With the help of this framework, CVA research will be able to be illustrated in a causally built context which contributes to sustainable development. Generally, the DPSIR framework clarifies the connection between climate change adaptation and sustainable development. If this is systematically established, it is only significant if a future-looking plan is set up.

The interactions mentioned above form an adaptive approach signifi-

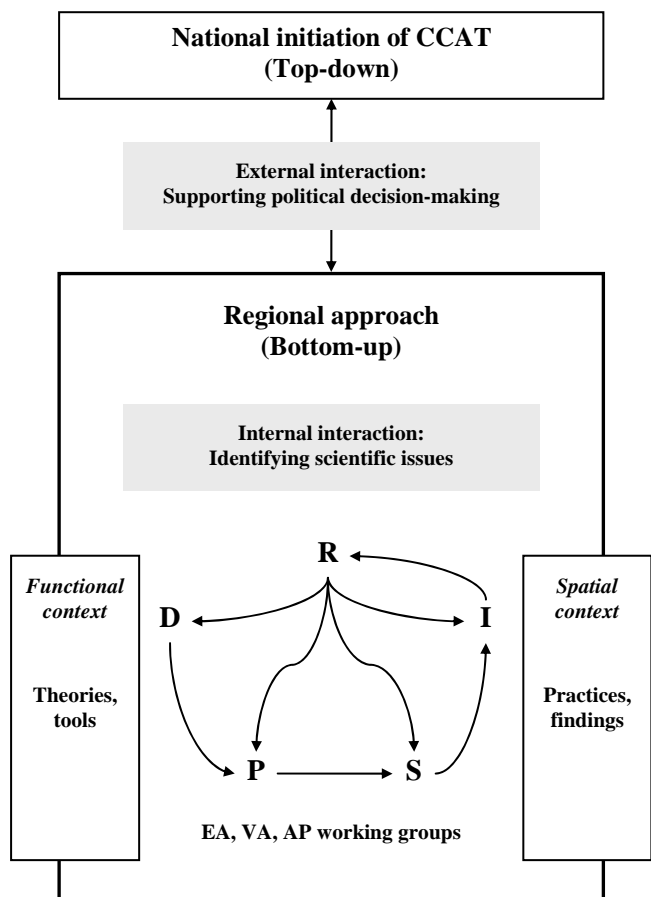


Fig. 1. Dynamic CCAT research approach

cant for dealing with uncertain climatic impacts given our limited scientific knowledge on climatic change. The goal is to foster dynamic development and synthesis of cross-disciplinary knowledge in complex ways. In addition, it is also of concern that the metrics that may be used to determine the goals of adaptation and the measures of its success can be understood only in terms of the social context in which adaptation takes places. Social science is highlighted in undertaking climate adaptation.

Overall, through our concept on dynamic climate adaptation, practitioners and scientists can be brought together and empowered with the knowledge and networks for innovative solutions on climate adaptation that we simply have to find.