

Multiscale Polycentric Governance in Transformative Adaptation to Climate Change: A Tool Guide

Upali A. Amarasinghe,¹ Giriraj Amarnath,¹ Sachini Ukwattage¹ and Hasula Wickremasinghe²

¹ International Water Management Institute (IWMI), Colombo, Sri Lanka

² Climate Change Secretariat, Ministry of Environment, Colombo, Sri Lanka

Summary

This innovation brief presents a set of standard operating procedures (SOPs) to operationalize multiscale polycentric governance (MPG) in using transformative adaptation options (TAOs) to enhance systemic resilience against climate change. The SOPs deal with identifying the transformative characteristics of adaptation options, the institutions involved in an MPG system, and the framework for assessing the ex-ante governance influence of TAOs in enhancing climate resilience via various intermediate impact dimensions. Such an evaluation can help in the allocation of investments in potential

governance components to ensure enhanced intermediate outputs, leading to sustainable outcomes of climate resilience and rural welfare.

Introduction

Climate variability and extreme impacts are increasingly being experienced in the economic sectors of many countries. These impacts on water, land, and the environment converge on the agriculture sector and affect rural welfare (Figure 1, Pathway 1). Enhancing coping capacity or implementing incremental adaptations are the primary responses to climate change (Pathway 2). However, changing only a few socioecological functions within a coping strategy or incremental adaptation is inadequate to address the drastic impacts of climate change. It will likely not lead to sustainable benefits. Ensuring sustainable agricultural production and rural welfare benefits requires the use of TAOs with MPG that can change many socioecological landscape functions to address increased climate variability and extremes (Pathway 3).

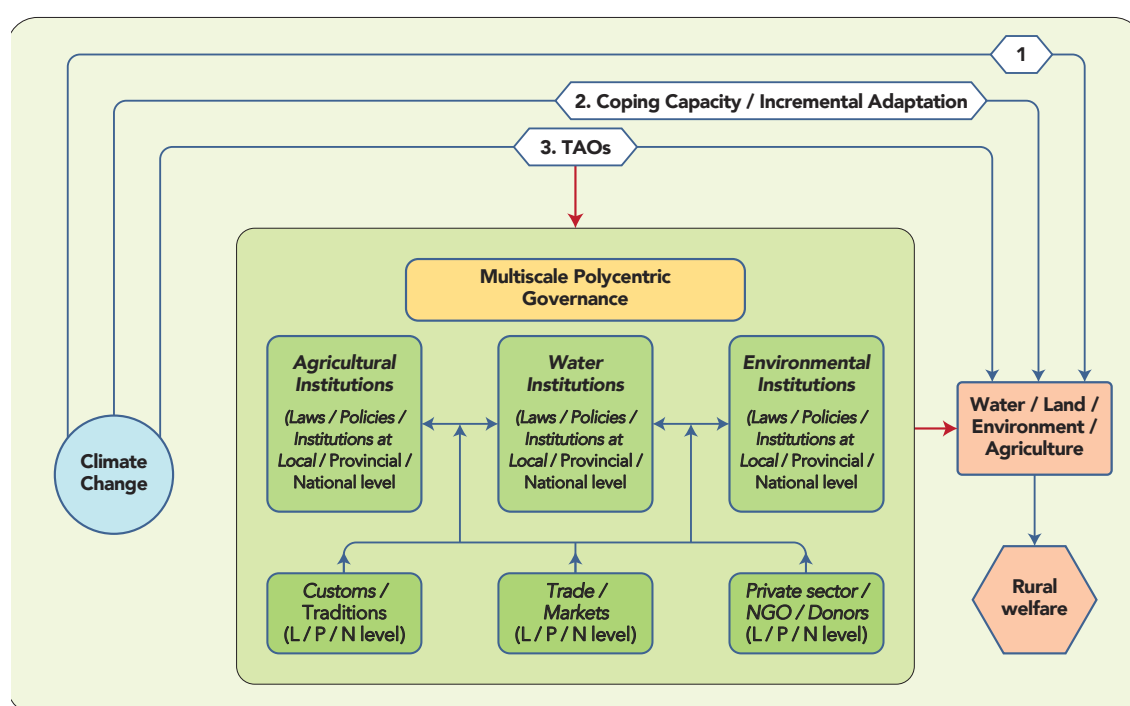


Figure 1. Pathways of climate change impacts on agriculture and rural welfare.

Source: Adapted from Saleth et al. 2023.

Transformative adaptation options must be relevant to the context in that they address the critical climate issues affecting the population of concern and be coherent with the development issues present in that region. Moreover, TAOs for systemic change will likely possess the following characteristics:

1. **Restructuring**—TAOs bring about shifts in some fundamental properties, functions, or interactions within a socioecological system (e.g., abandonment of a part of the land).
2. **Path shifting**—TAOs change the system's current trajectory to an alternative direction (e.g., from monoculture to mixed farming, from seasonal crops to tree crops, etc.).
3. **Innovation**—TAOs shift the system to a new state with new knowledge, policies, etc.
4. **Multiscale**—TAO impacts operate at multiple scales (e.g., from farm level to watershed to river basin).
5. **Systemwide**—TAOs make changes on a large scale at the regional, provincial, or national level.
6. **Persistent**—The benefits of TAOs are sustainable in the long term, although not irreversible.

Transformative adaptation options are necessary for systemic change but are not sufficient to bring about sustainable solutions to the impacts of climate disasters. Proper governance must complement the TAOs to ensure systemic change and sustainable solutions. However, most current interventions tend to have a top-down governance approach and limited cross-sector coordination. Multiscale coordination and collaboration in a system of polycentric governance could ensure sustainable transformative adaptation and benefits (Figure 1, Pathway 3). In MPG, multiple decision centers exist with a degree of autonomy while cooperating and coordinating with mechanisms for conflict resolution. Often, TAOs have multiple decision centers, e.g., water/land, agriculture, and environmental sectors, and many institutions at local, provincial, and national levels. Institutions that influence successful TAO planning and implementation include government, non-governmental and community organizations, national and international donor agencies, customary and traditional institutions, trade and markets, and the private sector. These institutions have a certain degree of autonomy to function within the socioecological context.

This document presents the standing operating procedures for planning and implementing transformative adaptation options within an MPG system.

SOPs for Developing TAOs with MPG

MPG-SOP 1: **Check the relevance and coherence of adaptation options**

- Assess the relevance of the TAOs, i.e., assess whether they address key climate change impact issues for relevant populations.
- Assess the coherence of the adaptation options, i.e., assess whether the key climate impact issues addressed are coherent with the development issues present in the region and what potential negative socioecological consequences the adaptation interventions might bring about.

MPG-SOP 2: **Check the characteristics of TAOs**

- Check the characteristics that could separate the adaptation interventions from being a coping strategy or yielding incremental adaptation benefits. These characteristics include restructuring, path shifting, innovativeness, multiscale relevance, system-wide operation, and persistence.

MPG-SOP 3: **Map the governance components**

- Many institutions, rules, regulations, and laws are part of TAO governance. Map the relevant components of governance at different scales (local, regional, provincial, national) and the sectors that would be associated with TAOs. These may include local, regional, provincial, and national-level water, land, environment, and agricultural sector policies, laws, acts and institutions, private sector, donors, etc.

MPG-SOP 4: **Develop an impact pathways/impacts framework**

- Identify the links of climate change, TAOs, and governance mechanisms with outputs and outcomes through impact pathways. Identify these linkages in the impact assessment framework in the context of specific geographical area(s) and TAO implementation (Figure 2).

MPG-SOP 5: **Consult experts/policymakers for feedback**

- Receive experts' feedback on TAO characteristics, institutional mapping, and the impact pathways framework.

MPG-SOP 6: **Consult stakeholders (local/provincial institutions and beneficiaries) for feedback**

- Receive feedback on the adaptation options and impact pathways from the local and provincial levels to modify MPG-SOP 3 and SOP 4.

MPG-SOP 7: Carry out a baseline survey and ex-ante governance impact evaluation

- Conduct a quick baseline survey of stakeholders to evaluate the ex-ante governance impacts. This will help identify the dominant institutions to implement and prioritize investments.

MPG-SOP 8: Finalize the TAO plan with a polycentric governance mechanism

- Finalize the TAO plans on the basis of stakeholder feedback and governance impact evaluation.

MPG-SOP 9: Identify the roles/responsibilities of institutions in the implementation and monitoring and evaluation plans

- Based on institutional mapping and the objectives of the TAOs, identify the roles and responsibilities of relevant institutions.

- Establish targets and accountability mechanisms.
- Lay out the monitoring and evaluation plan.

MPG-SOP 10: Project launch with key stakeholders (at the national and provincial levels)

- Sensitize relevant stakeholders on the project plan at the national, provincial, and local levels in different sectors.
- Target resource allocation in consultation with stakeholders to maximize the benefits as per the impact evaluation framework.
- Prioritize the components to implement.

MPG-SOP 11: Process monitoring and evaluation

- Conduct regular process monitoring and evaluation at the appropriate implementation level.

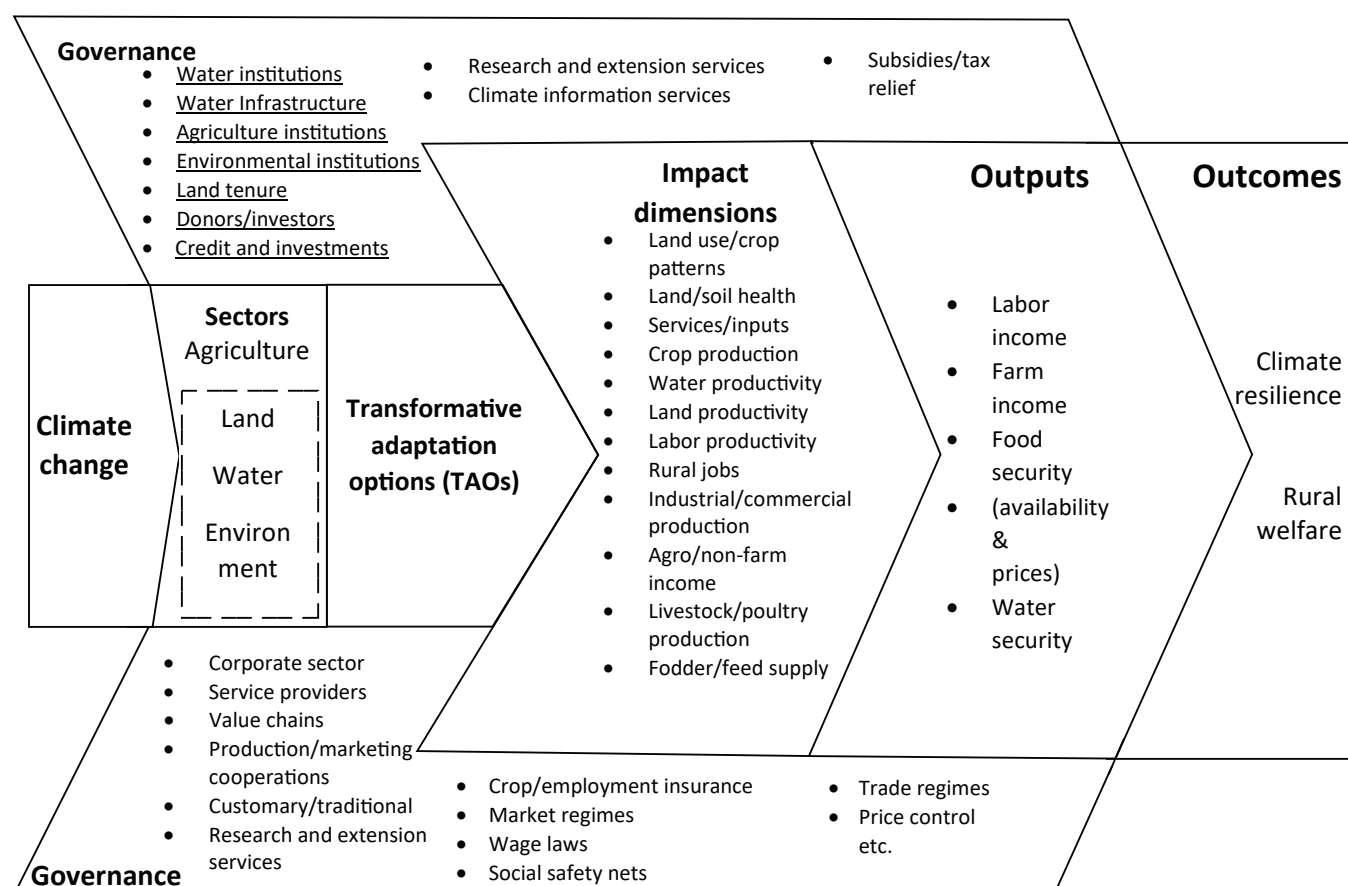


Figure 2. Impact pathways from adaptation interventions to impacts and outcomes.

Source: Adapted from Saleth et al. 2023.

Note: The combined climate change effects on land, water, and environmental sectors will exacerbate climate impacts on agriculture. TAOs address impacts in these sectors to enhance climate resilience and rural welfare via impact dimensions. The TAO influence on impact dimensions contributes to enhanced outputs, and hence, the outcomes.

Case Studies

This section provides two case studies to analyze the SOPs for TAOs aimed at enhancing climate resilience.

Case Study 1: Crop shift to high-value drought-tolerant fruit crops with drip irrigation in the Sina Irrigation System, India

Sina, a medium irrigation system in Maharashtra, India, faces frequent droughts. The extreme case of climate impact is when reservoir storage is insufficient to supply irrigation to farmers. Given the increasing frequency of extreme drought, the Sina irrigation system needs transformative adaptation options to mitigate the impacts. As an adaptation option (AO), Amarasinghe et al. (2021) proposed a gradual change in a part of the command area to include high-value drought-tolerant crops such as pomegranate or a green fodder production system to support raising livestock. This option envisaged providing some income to farmers even in extreme drought years while increasing incomes substantially in moderate drought and normal years.

MPG guidelines to make this crop shift implementable with an MPG structure

SOP 1 - Identifying the transformative adaptation options: (1) Shifting a part of the command area to high-value annual crops such as pomegranate; and (2) promoting drip irrigation through conjunctive irrigation (surface and groundwater) in canal command areas to address climate variability and extreme impacts of water scarcity.

SOP 2 - Transformative adaptation characteristics: Table 1 shows the transformative characteristics of the adaptation intervention.

SOP 3 - Governance components: The Maharashtra State Irrigation Department will be the dominant institution in the governance system for this AO. Collaboration with and coordination among several institutions will be required, including the Central Groundwater Development Board, the agriculture department, the marketing department, the ministries of irrigation, agriculture, and water supply, the private sector, rural service providers, laws, and regulations to change cropping and land-use patterns.

SOP 4 - Identifying impact pathways: Adaptation interventions work through a complex network of impact pathways (Figure 3) to affect outputs (water security, farm income, food prices, food availability) and outcomes (climate resilience and rural welfare). Nodes in this network of impact pathways and their links to governance (institutions and components) have to be identified. This is useful for getting feedback from implementing agencies, coordinating institutions, and beneficiaries

SOP 5 - Expert/policymakers' consultations: Such consultations before starting stakeholder consultations will help to firm up the project concept, the relevant governance components to address (institutions, policies, laws, regulation), and the impact pathways.

SOP 6 - Stakeholder consultations: This is an important step in establishing the MPG framework. Consultations during the planning stage with beneficiaries (farm organizations, farmers) and other stakeholders (irrigation, agriculture, groundwater, marketing departments) at various scales (districts, states, river basin) across different sectors will help finalize the project concept and improve coordination during the implementation stage.

SOP 7 - Baseline survey: Conduct a survey of stakeholders to assess the ex-ante impacts (physical and governance) of the interventions on the expected outputs and outcomes. This is necessary to get wider inputs from different sectors and scales within Maharashtra for assessing the ex-ante impacts of the project and prioritizing investments.

SOP 8 - Finalize the TAO plan with MPG mechanisms: The plan can be presented for approval by local stakeholders and local and international investors.

SOP 9 - Identifying the roles/responsibilities of key stakeholders: This is a critical step for establishing an MPG in the implementation stage. All key stakeholders should be treated as institutions with some autonomy, but working through coordination and cooperation with mechanisms of conflict resolution.

SOP 10 - Project launch: This is done in coordination with key stakeholders to implement the project with clearly identified roles and responsibilities and accounting mechanisms.

Table 1. The transformative characteristics of an adaptation intervention to shift to high-value drought-tolerant crops in the Sina irrigation system, Maharashtra, India.

Characteristic	Description
Restructuring	AOs bring about change in a small area to develop a higher-value production system.
Path-shifting	AOs shift from a lower-value production system to a higher-value production system with tree crops.
Innovative	AOs consider conjunctive (surface and groundwater) irrigation by design and not by default.
Multiscale	AOs can change the cropping system in and outside the canal command area.
System-wide	AOs will be a solution to water-scarce irrigation systems in a river basin.
Persistent	AOs will create sustainable income (with fruit crops) for farmers even in drought years.

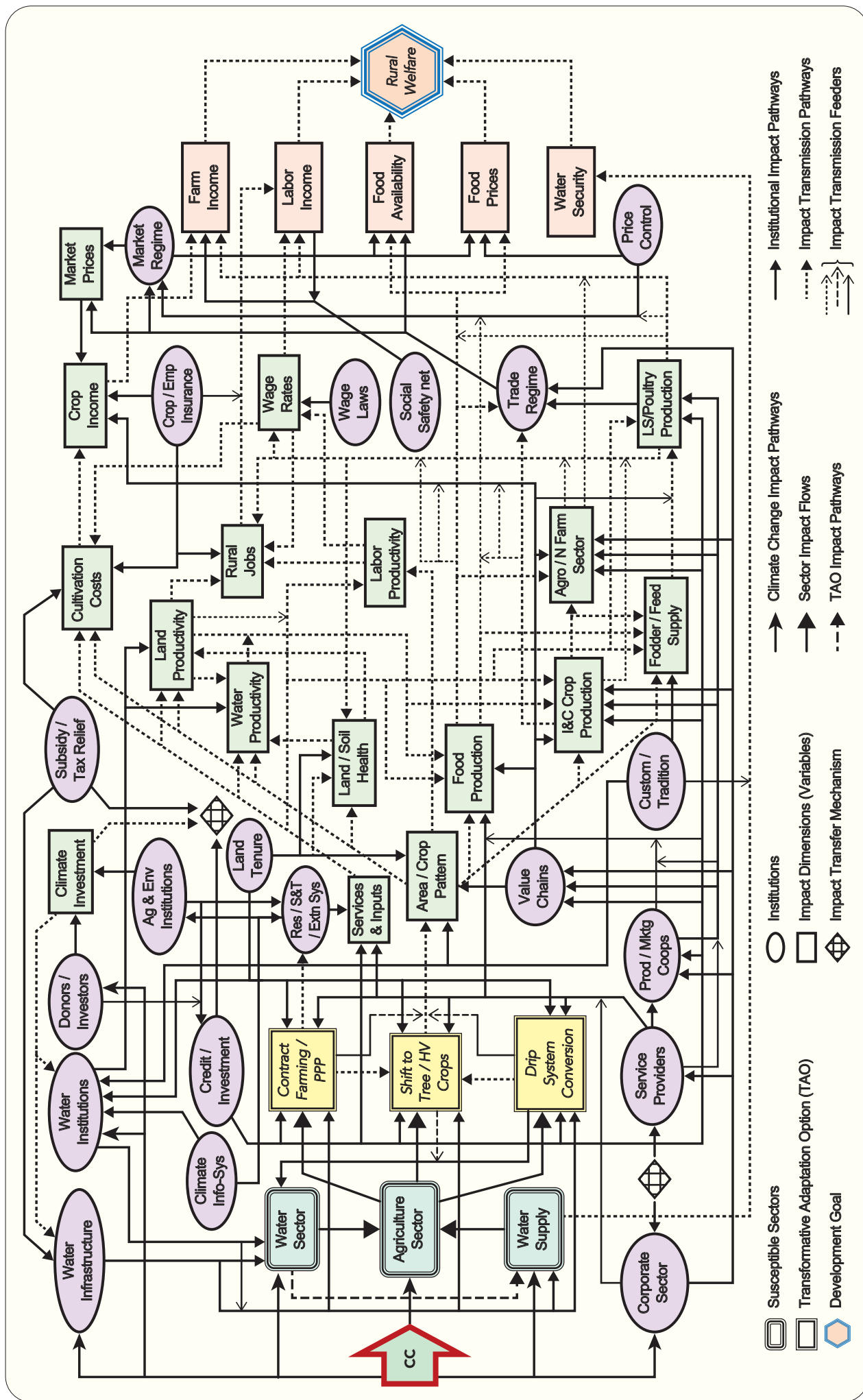


Figure 3. Analytics and pathways of the CC-TAO-MPG-RW interactions.

Source: Saleth et al. 2023.

Case Study 2: Forming cascade management committees and strengthening farm organizations in tank cascade systems in Sri Lanka

In Sri Lanka and the rest of South Asia, tank cascade systems are the first line of defence against the impacts of climate variability and extremes. But most of these systems are now in a dilapidated condition due to inadequate operations and maintenance and can no longer face the increasing impacts of climate variability and extremes. Forming cascade management committees (CMCs) with strengthened farmer organizations was an intervention implemented by two large climate adaptation projects in Sri Lanka: the Climate Resilient Integrated Water Management Project (CRIWMP) and the Climate Smart Irrigated Agriculture Project (CSIAP).

SOP 1 - Identifying the transformative adaptation options:

(1) Constitute CMCs for strengthening farmer organizations; (2) shift to higher-value crops; and (3) climate-smart agricultural practices.

SOP 2 - Transformative adaptation characteristics: Table 2 shows the transformative characteristics of the adaptation intervention.

SOP 3 - Governance components: Among the institutions involved in the CMCs, the Department of Agrarian Development is the dominant entity. It, however, requires the collaboration and coordination of several institutions, including the Central Groundwater Development Board, the agriculture department, the marketing department, the ministries of irrigation, agriculture, and water supply, the private sector, rural service providers, and laws and regulations to change cropping and land-use patterns.

SOP 4 - Identifying the impact pathways: The impact pathways shown in Figure 3 are adapted to the local condition of the cascades.

SOP 5 - Expert/policymakers' consultations: These can help to firm up the project concept, identify the relevant governance components to address (institutions, policies, laws, regulations) and impact pathways before starting stakeholder consultations.

SOP 6 - Stakeholder consultations: This is an important step toward establishing an MPG framework. Consultations with beneficiaries (farm organizations, farmers) and other stakeholders (irrigation agriculture, groundwater and marketing departments) at various scales (district, state, river basin) across different sectors during the planning stage will help finalize the project concept and improve coordination during the implementation stage.

SOP 7 - Baseline survey: A stakeholder survey is conducted to assess the ex-ante impacts (physical and governance) of the interventions on expected outputs and outcomes. This is necessary to get inputs from a wider group of stakeholders from different sectors and scales within Sri Lanka for assessing project ex-ante impacts to prioritize investments.

SOP 8 - Finalize the TAO plan with MPG mechanisms: The plan can be presented for approval from local stakeholders and local and international investors.

SOP 9 - Identifying the roles/responsibilities of key stakeholders: This is a critical step for establishing an MPG in the implementation stage. All key stakeholders should be treated as institutions with some autonomy while working through coordination and cooperation with mechanisms of conflict resolution.

SOP 10 - Project launch: This is done with key stakeholders to implement the project with clearly identified roles and responsibilities and accounting mechanisms.

Table 2. The characteristics of a transformative adaptation intervention to set up cascade management committees and shift to high-value crops in Sri Lanka.

Characteristic	Description
Restructuring	CMCs envisage restructuring the management of cascade systems. At present, CMCs have representation from various government institutions, the Department of Agrarian Development being the lead agency. Local leaders are the main decision-makers for water and agricultural management, with government and non-government institutions acting as observers and conflict resolution agents, or as actors enabling/providing support services.
Path-shifting	The AO can strengthen operations and maintenance, the main bottleneck at present, of cascade tank systems to a higher level.
Innovative	CMCs are an innovative concept in integrating the management of cascade tanks, which otherwise function in isolation, ignoring linkages with upstream and downstream tanks.
Multiscale	CMCs can influence the management of not only the individual tanks, but also tanks within the cascade system at various scales.
System-wide	CMCs influence not only the operation and management of cascade systems but also water availability and climate risks at the river basin scale.
Persistent	The influence of CMCs and improved farmer organizations should be persistent in managing the tank cascade system to have sustainable benefits.



Photo: Prof. Abdelkader Ait El Mekki

References

Amarasinghe, U.A.; Sikka, A.; Mandave, V.; Panda, R.K.; Gorantiwar, S.; Ambast, S.K. 2021. Improving economic water productivity to enhance resilience in canal irrigation systems: A pilot study of the Sina irrigation system in Maharashtra, India. *Water Policy* 23(2): 447-465. <https://doi.org/10.2166/wp.2021.231>

Saleth, R.M.; Ait El Mekki, A.; Amarasinghe, U.A.; Amarnath, G.; Brouziyne, Y. 2023. *Climate change, transformative adaptation options, multiscale polycentric governance, and rural welfare in Oum Er-Rbia Basin, Morocco: An empirical evaluation with policy implications. Project report.* Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Initiative on Climate Resilience.

Citation

Amarasinghe, U. A.; Amarnath, G.; Ukwattage, S.; Wickremasinghe, H. 2023. *Multiscale polycentric governance in transformative adaptation to climate change: a tool guide*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Initiative on Climate Resilience. 8p.

Disclaimer

This publication has been prepared as an output of the CGIAR Initiative on Climate Resilience and has not been independently peer reviewed. Responsibility for opinions expressed and any possible errors lies with the authors and not the institutions involved.



Ana Maria Loboguerrero Rodriguez, Initiative Lead, a.m.loboguerrero@cgiar.org

Jonathan Hellin, Initiative Co-Leader, j.hellin@irri.org

CGIAR is a global research partnership for a food-secure future. CGIAR science is dedicated to transforming food, land, and water systems in a climate crisis. Its research is carried out by 13 CGIAR Centers/Alliances in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector. www.cgiar.org

We would like to thank all funders who support this research through their contributions to the CGIAR Trust Fund: www.cgiar.org/funders.

To learn more about this Initiative, please visit [this webpage](#).

To learn more about this and other Initiatives in the CGIAR Research Portfolio, please visit www.cgiar.org/cgiar-portfolio

© 2023 International Water Management Institute (IWMI).

Some rights reserved.

This work is licensed under a Creative Commons Attribution-Noncommercial 4.0 International Licence (CC BY-NC 4.0).

