

CSIRO-AusAID Alliance Tigum-Aganan Watershed Management Project: Workshop Report, Iloilo City, Philippines May 2009

Introduction

Concerns over the capacity of the Tigum-Aganan Watershed in Panay Island, Philippines to provide water security and support livelihoods have resulted in a number of policy responses. However, there remains ongoing disagreement over water management. Stakeholders in the TAW approached the CSIRO AusAID Research for Development Alliance to provide assistance. Consequently, the Alliance led a *Vulnerability* and *Water Needs* assessment of the TAW to support decision making through a mediated scientific-stakeholder process incorporating conceptual systems modelling and evidence-based decision support tools.

Methods

Stakeholders in the management of the Tigum-Aganan Watershed engaged in a systematic process to assess local and regional vulnerability to climate change and to consider potential adaptation options. Thirty two participants were invited to contribute to the workshop based on their involvement in watershed management and/or regulatory roles in the TAW. Several activities were undertaken during the 5 days, including focus groups discussions, interactive workshops and a fieldtrip.

Determination of the community's vulnerability to climate change involved an assessment of the exposure of the community to physical elements such as acute weather events and understanding the range of social and economic conditions that facilitate or limit adaptation. A participatory process was used to assess the vulnerability of the people and their environment. Complex systems dynamics were explained and the possibility of using mediated system dynamics modelling to further explore the issues was discussed.

This information was further analysed through a multi criteria analysis of the water needs of the watershed. The workshops used a participatory and deliberative methodology to inform a multi criteria analysis of the water needs of the watershed. Application of the Water Needs Index methodology allowed for a rapid assessment of water needed within the watershed while noting many contextual and multi-faceted issues impacting on future water management options.

Results

The workshop identified three key issues for the watershed, namely ensuring water security, exposure to natural hazards induced by weather events, and sustainable livelihoods. It was considered that their vulnerability and adaptive capacity is, or is likely to be, exacerbated or constrained by poverty, a growing population, inappropriate land use, political governance issues, limited institutional resources and climate change. The workshop identified that the changing global climate is projected to exacerbate the extent and scale of natural hazards such as flooding and landslides, reduce the security of supply of potable and irrigation water and affect agriculture in the Tigum-Aganan Watershed.

The benefits from combining participatory procedures with modelling techniques has been the sharing of knowledge and information between local experts and with researchers through a simple,

understandable and flexible approach to gathering data, opinions and to explore topics. This information can then be used to assist collective decision-making processes and in the establishment of a collective vision for the future management of the resource. The effectiveness of the Water Needs Index approach has been to open dialogue and improve understanding of the functioning of the watershed in different municipalities, exploring the ability to access quality water and the problems arising from natural hazards, particularly flooding events, in maintaining supplies of water.

Conclusion

An assessment of Vulnerability (Miller et al. 2009a) and construction of a WNI have been used to understand many pertinent issues affecting the watershed. Collectively, the methods have provided a more complete picture of the many issues and possible solutions and activities that could be conducted in the watershed. The key issues for stakeholders of the TAW relate to water security, exposure to natural hazards and creating sustainable livelihoods options. Residents are vulnerable to the impacts of climate change due in part to socioeconomic conditions and circumstances, which affect their capacity to respond or proactively adapt.

The effectiveness of the WNI approach has been to open dialogue and improve understanding of the functioning of the watershed in different municipalities, exploring the ability to access good quality water and the problems arising from natural hazards, particularly flooding events, in maintaining supplies of water. The next step is to engage resource decision makers and facilitate planning that incorporates the knowledge gained through the WNI process of ranking in identifying key areas of concern in the various municipalities. The research is essential to further collaborative efforts with water managers in partner countries.

There are key issues confronting each municipality and Iloilo City reflecting geographical, demographic and industrial features as well as specific water availability and extraction. The Management Board is now in a position to use the findings to tailor programs that target the constraints to water availability in each municipality. The following recommendations detail the key areas of potential threat to water supplies and obstacles to ongoing sources of good quality water and should be considered with regional decision makers when developing future natural resource planning.

Recommendations for the future

Future research is recommended that is primarily in partnership with the Management Board and affected communities. Future inter-sectoral research projects should seek to engage stakeholders to achieve mutual understanding of current and future environmental and economic conditions, individual/community aspirations or goals, institutional requirements and constraints and to develop sustainable solutions. Suggested areas for research and development projects include;

Maasin- Protected watershed

- Work with TAWMB to model the hydrological and sediment budgets for the watershed under various climate and land management scenarios in order to inform land use planning and implementation in the catchment. The modeling can help inform where to revegetate to reduce erosion and where agriculture or plantation forestry can best occur. It will also help the Metro Iloilo Water Department and the Irrigation Association plan for water supply management under variable conditions.
- Work with the Department of Environment and Natural Resources and the Metro Iloilo Water Department to develop low technology options for desilting water instream before water off takes, e.g. creating roughness instream through woody debris or manufactured structures.

- Engage in participatory research with TAWMB, local community organisations, and the community to explore resolution of perceptions of social injustice around management and regulation of the protected area.
- Explore livelihoods options that protect water supply and improve land management.

Water security

- Work with TAWMB to develop better and common understanding of the effect of climate change, El Nino conditions, and land management on river flow and aquifer recharge dynamics.
- Work with the Metro Iloilo Water Department and the Governors office to develop plans and policies for conservative supply and demand management in the face of climate change, increased population, and limited infrastructure/resource base.
- Develop low technology options for personal or community rainwater harvesting, with tanks, impoundment in rice paddies or created wetlands, etc.
- Model the recharge rates of groundwater under various climate scenarios and sustainable extraction rates. Develop monitoring capacity to trigger reduced extraction, and policies to manage demand.
- Explore the potential to treat and recycle stormwater and/or sewage for use in irrigated agriculture in the lowlands, or to be injected into aquifers for recharge. There will be a need to look at infrastructure and maintenance limitations, as well as seeking low technology options.
- Develop comprehensive watershed management plans to revegetate protected areas with suitable vegetation types.
- Develop policy for providing for water allocations under variable climatic conditions.
- Increase the efficiency of irrigation, including water recycling and reticulation. Convert to low water use crops.

Natural hazards

- Improve the monitoring and forecasting of droughts and floods, and establish action plans with dedicated resourcing for their implementation (Jose and Cruz 1999).
- Develop early community warning system based on medium to long range weather forecasts of impending storm events. Work with upland communities to identify risk zones for houses, infrastructure, and agriculture, and develop affordable options for mitigation or adaptation.
- Develop and implement early warning system for flash floods in the uplands. Have mutual technological and networked human based options. The technological option should be low tech, easily maintained, and physically robust; possibly based on mobile phone technology or mountain radio technology. Municipalities to have adequate response policies, including 24 hour monitoring, networked warning of communities, community response strategies, etc.
- Build capacity of Iloilo City and Municipalities to plan for and regulate land use in the face of climate change, known hazards, and population growth. Ensure adequate governance. Develop relationship between planning departments of major and minor cities in Australia, involving opportunities for exchange of staff both ways. Establish relationship between planning departments in Australian universities and local Universities for training, research, curriculum development etc.
- Replant mangroves to reduce storm damage to coastal areas, but also to improve fisheries and sediment trapping. Use this process as a direct and indirect livelihoods enhancement program.
- Examine the options for floodwater diversion or storage in wetland systems in surrounding municipalities to reduce peak flow at Iloilo City and to recharge aquifers.

Creating sustainable livelihoods

- Implement farmer collectives in conjunction with the Municipalities to work together to understand and address the environmental and economic challenges facing agriculture in the watershed. Facilitators experienced in community engagement and sustainable agriculture should be employed for this purpose. One of the most important initial topics for discussion

would be the use of terrace farming in the uplands to reduce erosion and increase productivity. The collectives could also engage in experimenting with dry season crops, water conservation etc. Involve the local Universities in research and learning associated with this.

- Establish a relationship between Alimodian Municipality and the Biological Farmers of Australia (www.bfa.com.au) to develop improved and profitable organic farming practices. Encourage and facilitate organic farmers to establish co-operatives for producing and marketing produce. Involve the local Universities in research and teaching associated with profitable organic farming.
- Explore the development of ecotourism (including the possibilities and pitfalls), cultural tourism, and/or community/volunteer tourism with upland and/or indigenous communities. Explore the marketing of arts, crafts, produce or tourism to a wider audience through 'novel' means, e.g. the internet (even the Adriano Cabardo National High School at the top of the Aganan Catchment was getting internet access). Explore other livelihoods options with communities.
- Improve planning capacity to protect valuable farmland and implement appropriate development for population growth and/or urban expansion in surrounding municipalities.

References:

Alexander, K.S., Miller, C., Jovanovic, T., Moglia, M. (2009) Tigum-Aganan Watershed Management Project, Part 2: Developing a Water Needs Index. CSIRO: Climate Adaptation Flagship.

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