World Agroforestry Centre

CONFLICT, COOPERATION, AND COLLECTIVE ACTION

Land Use, Water Rights, and Water Scarcity in Manupali Watershed, southern Philippines

Key findings

1. Voluntary cooperative agreements are instrumental in resolving water rights conflict, and can lead to new forms of cooperation and a higher level of collective action.
2. A shared understanding of the relation between water balance and land-use patterns is crucial to address water management problems.
3. Effective watershed management requires collective action at that level, and cooperation among all user groups should be coordinated to foster lasting watershed-level collective action.

Implications

1. The fairness and equity of voluntary agreements must be considered because the cooperating user groups extract benefits from non-cooperators who may have incurred the costs of protecting the upper watershed to maintain water supply.
2. Issues around overlapping management regimes, lack of coordination and low capacity of water management institutions need to be resolved in order to address systemic watershed management problems.
3. A reward scheme for watershed services (RWS) may foster watershed level collective action in the case of Manupali in southern Philippines.

Introduction

Poor land use and unsustainable practice are degrading watersheds and affecting water availability. However, multiple property rights regimes and institutions responsible for managing critical watershed resources leads to competition for water and conflict among the involved institutions and users.

Population growth and economic development have resulted in increased water demand for domestic, agricultural and industrial uses, with agriculture as the highest water consumer of up to 90 percent, particularly for irrigation to produce more food, the Pacific Institute reported in 2009. How is it possible then to produce more food and ensure functional industries with less water? Studies say that many areas around the globe have already reached their optimum or “peak water” capacities to absorb the consequences of excessive water use.

The problems of water scarcity, allocation and land use require collective action beyond the current level if equitable distribution of benefits, sharing of responsibilities and coinvestments in watershed management are the goals.

Many cases of water competition and conflict have been reported in the Philippines. Misallocation of water has triggered conflict between upstream and downstream farmers in San Pablo City, as the use of upstream water was shifted for municipal use, reducing

Small agroforestry farms in the foothills of Mt. Kitanglad depend on water for vegetable production (photo by: Lyndon Arbes)

the annual cropping cycle for rice. Because of the resulting crisis in irrigation water, farmers called for the government's attention to prioritise irrigation programs to help them produce rice to address domestic demand rather than rely on rice imports. Other water disputes include arguments over compensation for changing water allocations in Angat Dam, coastal households' accusations that big industries are causing saltwater intrusion in Batangas City, and the unregulated groundwater usage in Cebu City that has caused seawater intrusion.

The World Agroforestry Centre (ICRAF) studied the Manupali watershed in the Philippines to provide more insight to problems surrounding water management there, where there is overall water scarcity and conflicting water rights of different users. ICRAF found that sustaining the environmental, social and economic development in the Manupali watershed in the Philippines was highly dependent on the equitable allocation of water-use rights and judicious utilisation of water as a scarce resource.

There are many stakeholders and water users in Manupali watershed area: smallholder farmers, indigenous people, multinational companies, the local government, the National Irrigation Administration, and the National Power Corporation (Pulangui IV). As demand for water outstrips supply, conflict arises between different user groups over who can use water and how much each one can use. This paper reports initial results of an ongoing study that examines water rights and land-use change to better negotiate for greater investment in watershed management.

To avoid hostile confrontation between different user groups and to manage competition of water use, some user groups have instituted voluntary agreements for water rights sharing. Voluntary agreements may facilitate conflict management of a disputed resource, but the fairness and equity of such agreements are in question because the cooperating user groups extract benefits from non-cooperators who may have incurred the costs of protecting the upper watershed to maintain water supply.

Water use and ownership rights

The absence of clearly defined water property rights has been identified as a major factor in the failure of sustainable watershed development in Manupali, as it discourages smallholders to adopt conservation practices, such as contour farming, and invest in land improvements such as planting trees.

Water use and ownership rights are central to water resource management. Defined as "The capacity to call upon the collective to stand behind one's claim to a benefit stream", property rights involve a relationship between the right holder and an institution to assert that claim. In the context of water, the rights to use include access and withdrawal, while control rights refer to management, exclusion and alienation. In the Philippines, two major national laws define water use and control rights: The Water Code (PD 1067) on statutory rights and the Indigenous People Rights Act (IPRA 8371) for customary rights.

However, these same laws often create conflict. The Code provides that "All waters belong to the state" and "cannot be subjected to acquisitive prescription", but may allow its "use or development" through the "control and regulation of the National Water Regulatory Board (NWRB)" based on the country's priorities. The customary rights upheld by the IPRA, by contrast, are based on tradition and culture of Indigenous peoples (IPs) rather than on written law. The rights to access and use water, among other resources, are based on IP's concept of land: That land is granted and entrusted by a Creator, and everyone has a responsibility to harness and cultivate it. While the Code grants water rights as a privilege to allocate and use water, customary rights, in contrast, do not recognise private ownership but assume collective ownership: Water cannot be privately owned, sold or leased. This difference in principles and perspectives has led to conflict between the government, IPs and other water users.

Manupali case study

The case study of water use in Manupali, the Philippines shows the competition and conflict caused by water scarcity and overlapping water use and ownership rights, and the cooperative agreements adopted by different water users in the Manupali watershed, Bukidon province, southern Philippines.

The key user groups are smallholder farmers and IPs for crop production, multi-national companies for banana and pineapple production, the local government unit for potable water supply, the IAs through the National Irrigation Administration (NIA), and the National Power Corporation (NPC)-Pulangui IV for hydroelectric power generation.

watershed services that are of sufficient value to downstream stakeholders, and becomes the basis for reward mechanisms. A local team was organised and trained in 2008 to implement the RHA tool. To facilitate meaningful participation of water users, the RHA integrated the local (LEK), public/policy (PEK) and scientific/modeler's ecological knowledge and perceptions (MEK) in understanding the problems related to watershed functions and to find solutions.

Agricultural expansion has led to land use conversions in to banana, corn, vegetables, sugarcane and other crops, which decreased the forest area by 6 percent and 3 percent between 1990-2002 and 2002-2007, respectively. Similarly, the area dedicated to agroforestry has decreased by 2 percent between 1990 and 2002,

The Manupali River not only supports the Bukidnon irrigation system for rice production, but also serves as transportation of non-timber forest products, such as bamboo (photo by: Caroline Duque-Piñon)

Small farmers are important source of knowledge to better understand Manupali's current watershed functions (photo by: Caroline Duque-Piñon)

As demand for water outstrips supply, competition and conflict arise between these different users over who can use water and how much each one can use. The case of Manupali highlights the potential of water competition and conflict to produce cooperative agreements that lead to benefit sharing. However, as a first step towards collective action at the watershed level, it is important to reach a shared understanding on the actual water balance and its dependence on land-use patterns.

Rapid Hydrological Appraisal (RHA) conducted from July 2009 to January 2010 is a hydrological assessment tool developed by ICRAF in Bogor, Indonesia, that clarifies relations between specific land use and

and further dropped by 73 percent between 2002 and 2007. Similarly, mixed agriculture increased by 18 and 24 percent between 1990-2002 and 2002-2007. With increasing demands for land for smallholder production and agribusiness, and lack of land use policy, it is expected that cultivation will encroach into the buffer zone of MKNRP.

The Manupali River Irrigation System (ManRIS) has reported sedimentation problems in the diversion dam and irrigation canals. From 1995-2002, ManRIS incurred 17 million PhP in desilting the dam and irrigation canals, through dredging or flushing out silt materials to the Pulangui River, leaving the NPC reservoir with

an estimated silt deposit of 1.5 meters cubed (m^3) per year. As a result, the voluminous silt is limiting water inflow into the reservoir and affecting water supply. Siltation has reduced the reservoir's storage capacity by up to 30 percent. The NPC has already paid more than 200 million PhP to dredge the reservoir since the dam's construction in 1986.

Based on the LEK-PEK survey, the main concerns of stakeholders were declining water quality and quantity because of sedimentation and flow diversion. Stakeholders also reported observations on stream flow variability in association with changing rainfall patterns.

A majority of upstream water users, such as farmers and banana plantations, did not report serious problems regarding water supply, whereas water users from middle to lower sections of Manupali, identified water scarcity as a serious problem that severely affected their economic activities. They identified several factors affecting water scarcity, but primarily linked water shortage to land-use change associated with banana expansion and forest conversion into agriculture.

Stakeholders must have a common understanding about watershed functions so that interventions can take place. Small changes in water use may have huge impacts on water balance. Scientists used the ArcSWAT model to examine relations between land use and sedimentation. Results of the model corroborated the observations of local stakeholders in LEK survey showing that converting 50 percent of forest and grasslands of sub-watershed into crop production will result in about a 3 to 14 percent increase in run-off, 200-273 percent increase in sediment yield, and 2.8 to 3.3 percent decrease stream flow, with the higher value indicating a condition without soil and water conservation (SWC) measures. Much of the rainfall is lost as surface runoff, which results in significant soil erosion, sedimentation in dams and reservoirs, and downstream flooding.

In terms of supply and demand, the total volume granted to banana plantation companies and a few individuals in Alanib, Maagnao and Kulasihan sub-watersheds were 10,146 m^3d^{-1}, 13,153 m^3d^{-1} and 29,217 m^3d^{-1} respectively. The total water yield for each river were 26,784 m^3d^{-1}, 128,736 m^3d^{-1} and 37,152 m^3d^{-1} based on GenRiver simulation. Hence, the net volumes available to other water users of the three rivers are 16,525, 115,383 and 7,848 m^3d^{-1}. However, ManRIS's water rights alone, of the Manupali River and all its tributaries, are 492,480 m^3d^{-1}, meaning that ManRIS cannot attain the volume to which its water rights entitle it.

The relation between banana expansion and water availability calls for effective land-use planning and enforcement of land-use policy. Clearly, there is overall dependence on river water by plantations given the standard irrigation requirement of no less than 45 $m^3ha^{-1}d^{-1}$ to produce high quality export bananas. Although rainwater is harvested and utilised by banana plantations, it is important to accumulate and

Banana plantations across the watershed are among the major water users in Manupali (photo by: Marcel Langer)

store water in a reservoir by diverting river flows, to supply year-round irrigation. In 2007, the total banana plantation area in Kulasihan was 578.52 hectares with an irrigation requirement of 9,502,190.90 m^3. But the average annual yield of Kulasihan is only 11,599,019 m^3yr^{-1}, indicating that the banana plantations' share of the Kulasihan water is about 80 percent. The remaining 20 percent share is presumably distributed to other users such as ManRIS, farmers, poultry operators and households. Increasing the current size of banana plantations will therefore leave other users with little water.

Using a different approach, Lacandula compared the stream flows with and without banana land use and found that the monthly average stream flow between the two was significant: "With banana land use" has a 0.071 m^3s^{-1} stream flow while "Without banana land use" has 0.377m^3s^{-1}. The study also looked at the effects of diverting flows for plantation operations and found that diversion significantly reduced downstream flows. Further, it was estimated that on average, 26,590 m^3d^{-1} was diverted from Maagnao River to the banana plantation, which is 100 percent more than the total granted volume of all permit holders in Maagnao.

Maagnao River- a tributary of Manupali River (photo by: Caroline Duque-Piñon)

Without diligent monitoring, it was convenient for plantation companies to divert more water than what was permitted by NWRB.

Water competition

ManRIS and banana companies together require the highest volume of water, meaning their expansion will lead to a net deficit in water supply for other users, potentially raising the likelihood of conflict. Water-use competition leads to scarcity, depletion and degradation of underground and surface water. In addition it aggravates conflict between upstream and downstream residents because of overlapping water rights and poor levels of benefit sharing.

In upper Manupali, water scarcity has been the source of conflict in drier periods where farmers compete for access. Village leaders reported disputes among farmers who accuse each other of either stealing or cutting irrigation pipes or destroying small impounding reservoirs.

Conflict began when Dole's application for water rights in Maagnao River was rejected by NWRB because MKAVI had already obtained water rights in 1999, including Alanib and Kulasihan rivers. But the issue became more complicated when ManRIS presented its water rights of Manupali River and all its tributaries granted in 1979. "Water rights" quickly became a major dispute between banana companies and ManRIS. In the Water Code, a "priority date system" applies, where the rights belong to the user in the order in which they apply, hence ManRIS would have been the senior water rights holder in Manupali. The Code also stipulates that in times of water shortage, those with senior rights can use the full volume allocated to them, while those with junior rights must do with less or nothing.

Cooperation

Water competition could trigger violent confrontations. However, fortunately stakeholders in Manupali have avoided hostilities by voluntarily agreeing to cooperate on applicable water rights sharing schemes. The various cooperative schemes are summarised below.

- **ManRIS and MKAVI.** The management of MKAVI has recognised that ManRIS has prior water rights over the Manupali River and its tributaries. It also recognises the impact of its diversion canal on the availability of irrigation water to rice producers. To avoid conflict, MKAVI agreed to pay an irrigation service fee (ISF)

to ManRIS, a form of settlement to compensate for the water that could have been used for rice production. The company is currently paying an ISF equivalent of a total of 150 hectares of irrigated rice.

- **Dole and Hilltop Multi-Purpose Cooperative (MPC).** The companys application for water rights was denied because of overlapping rights held by MKAVI and Hilltop MPC in Maagnao River. Hilltop MPC is a farmer cooperative that obtained water rights for Maagnao River in 2000. Through negotiations mediated by village officials, MPC members entered into an agreement with Dole to share their water rights, on the condition that the company extends livelihood assistance and employment to Hilltop farmers.

- **HIVAC and the IPs.** Mediated by the PAMB, the Celebrate Life Banana Company successfully negotiated with the Talaandig community within a Community-Based Forest Management (CBFM) area for the water rights of Kibuda spring. The legal basis of the negotiation was the NIPAS and IPRA Laws. In return, the company funds a community conservation project covering 5,000 hectares, and supports livelihood projects.

- **ManRIS and AMSFC.** Since ManRIS is unable to maintain the road system within its service area, they accepted the company's offer to maintain the road system and an ISF equivalent to 375 kilograms of rice $ha^{-1}yr^{-1}$. As part of the company's corporate social responsibility (CSR) program, it also supported tree-planting activities along the small creeks in the service area.

- **Cawayan Village Government and the IPs.** To provide the residents with potable water, the IPs permitted the village government of Cawayan to develop a reservoir for the community's water system. In turn, the government will share 10 percent of the project's income to the IP tribe, which will be used for watershed protection activities upstream.

- **Green River Gold Ranch and the IPs.** The Green River Gold Ranch entered an MoU with the IP community, to draw water from an open-access spring, for a small water impoundment in the ranch. In turn, the ranch pays one cattle for every 100 cattle $year^{-1}$ to the IP community.

These agreements were initiated independently by and among water user groups, with limited external mediations, and show how local stakeholders manage, organise and cooperate in the face of change. Such agreements were based on the provisions of the Water Code, which allows the transfer or lease of water rights in whole or part to other users, and also the adoption of pricing schemes. Existing policies, despite their complications and ambiguities, provide a starting point for voluntary cooperative actions to manage scarce water resources, although they do not guarantee a long-term solution when it comes to addressing the root causes of water scarcity.

These cooperative acts are results of reciprocal altruism, according to cooperation theory, which is based on the idea that an individual will not be disadvantaged by helping another person, provided the other helps in return. It can be argued in this case that different users opted to cooperate because everyone recognised the (i) value of water (ii) scarcity of water (iii) social capital that exists between and among them and (iv) legal basis for voluntary agreements and water management. However, cooperation does not emerge easily with self-interest standing in the way. There were concerns that these voluntary water rights sharing schemes were partial to the interest of banana companies, with farmers incurring much of the present and future costs of cooperating.

As in any cooperative arrangement, the situation is complicated by power imbalances between the actors, which can distort the balance of the favors that are being exchanged, and eventually break reciprocity. Farmers disclosed to ICRAF that many of the conditions in the contract were not adhered to by multi-national companies in the area. IAs reported that they did not receive benefits from the cooperative agreement of ManRIS and MKAVI. Similarly, farmers complained that the local government did not provide benefits for supporting the expansion of banana plantations.

Despite these complaints, stakeholders continue to cooperate to secure their respective rights by sharing them with others, instead of harboring conflict. Such cooperative acts thus have their merits, because they help mitigate hostile confrontation between different users. However, these forms of cooperation and temporary institutional arrangements can break down easily if the actors or cooperators cease to interact, reorganise and re-cooperate, and adapt to new rhythms of change.

An emerging problem at the landscape level is the distribution of benefits to upstream communities. As it is, current cooperators are together extracting favors from other stakeholders who were non-cooperators, namely farmers in the upper watershed who may have incurred high opportunity costs by not shifting their land use to maintain watershed services. Cooperators currently in the table may have cheated by receiving favors and gaining benefits without sharing any of the costs incurred by non-cooperating stakeholders. This creates another level or type of inequality. The threat is when upland communities shift to poor land-use practices if they continue to be excluded from the benefits enjoyed by current cooperators.

An important question is whether collective action in the form of voluntary agreements for water rights sharing has, in this case, addressed the core problem of water scarcity. The RHA has shown that water availability and scarcity are linked to land-use patterns, with water rights confounding the issue. From a water balance perspective, further expansion of banana plantations and poorly designed tree plantations of fast-growing evergreen tree species will further lead to water shortage, while a decrease in natural forest will lead to poor stream flow or water irregularity.

Way forward

Sustainable land use that helps improve water yield and reduces stream flow variability is essential to improve water balance and reduce deficits in water supply. This objective is untenable without collective efforts of all users and other stakeholders at a watershed scale. Policymakers should be much more involved in fostering collective action at that level, and in implementing policies that provide incentives for sustainable land use.

The multiplicity of interests of the stakeholders, the ambiguity in water rights and the lack of understanding of the relations between land use patterns and hydrology, present greater challenges in fostering collective action at the watershed scale.

Different water-use groups have created Intra and intergroup collective actions by agreeing to cooperate to manage conflict over water use and rights, but collective action beyond this point can be hampered by a lack of understanding of the real water balance of the watershed. As a first step, collective understanding of the importance of water balance and its dependence on land use patterns is important to foster collective action for sustainable land use. A combination of action on land use policies, water rights, institutional arrangements and incentives for co-investments and collective action is necessary to resolve watershed management conflict. The RHA results have proven useful to policymakers and other stakeholders, particularly the water balance and yield associated with existing land uses and land cover scenario simulations. The local government announced a policy statement to regulate the expansion of banana plantations.

In response to the above recommendations, the local government of Lantapan enacted Municipal Ordinance No. 14, which provides incentives to encourage

Understanding the relations of land use and water balance prompted the water users in Manupali to foster cooperation by developing a reward scheme that would sustain the provision of water (photo by: Lydia Tiongco)

farmers to invest in or shift to sustainable land use practices. While it is new, government agencies and private companies have started to support the program. A reward scheme for watershed services (RWS) is now being negotiated between farmers in Alanib sub-watershed and NPC-Pulangui IV, facilitated by the ICRAF-RUPES (Rewards for Upland Poor for Environmental Services) project. This RWS is hoped to foster watershed level collective action in Manupali.

CONCLUSION

Several lessons, and recommendations can be drawn from the case of Manupali that can guide policymakers, practitioners and farmers to improve cooperation and collective action to resolve water competition and conflict that is linked to rights, scarcity and land use:

1. Voluntary cooperative agreements are instrumental in resolving immediate water rights conflict and can lead to new forms of cooperation and a higher level of collective action.
2. Even when official policies are ambiguous or contradictory, they can provide legal bases for the emergence of voluntary agreements. However, issues around overlapping management regimes, lack of coordination and low capacity of water management institutions need to be resolved in order to address systemic watershed management problems.
3. A shared understanding of the relations between water balance and land-use patterns is crucial in unpacking complex issues. Equitable allocation of water rights alone will not ensure water supply in the long term. Land use regulation, incentives for sustainable land use and improving water rights can provide win-win solutions.
4. Effective watershed management requires collective action at that level, and cooperation among all user groups should be coordinated to foster lasting watershed-level collective action.

The situation in Manupali provides great understanding into competition, conflict and cooperation over scarce natural resources. Stakeholders, despite their distinctive identities and interests, were willing to cooperate and self-organise to manage conflict, with all the imperfections of water rights sharing schemes.

However, the problems of water allocation, scarcity and land use, require collective action beyond the current level to achieve equitable distribution of benefits, sharing of responsibilities and co-investments for watershed management.

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