In Lantapan, stakeholders believe that diplomatic confrontation of realities rather than avoidance ends with "win-win" solutions

Lantapan exemplifies tension between rapid economic growth and environmental degradation. The diverse stakeholders, namely farmers, banana plantation companies, local government officials and politicians, national irrigation administrators, irrigators, and the national power corporation learn that with proper negotiation and incentives, hostile confrontation on the emerging water crisis can be avoided.

The Context

Lantapan is located in the western part of Bukidnon Province with an average elevation of 600 metres, which increases to a maximum of 2,938 metres. About 70% of the area has slopes greater than 10%. The average annual rainfall is 2,470 mm. Air temperature and solar radiation decrease with elevation. Lantapan's population revealed a steady increase since the 1970 census. In 1995, the National Statistics Office (NSO) recorded a total population of 36,943, which increased to 42,383 in 2000. Given this, it was projected that the present population will triple in the next 15 to 20 years.

Lantapan harbors two important ecosystems. The left bank of the Manupali River bounds Lantapan on the south, and a major protected area on the north, the Mt. Kitanglad Range Natural Park (MKNRP). Several tributaries drain from Mt. Kitanglad, crossing the extensively cultivated lands to the Manupali River. The river runs into a network of irrigation canals operated by the Manupali River Irrigation System (MANRIS).

The whole system ultimately drains into the Pulangi reservoir, utilized for hydroelectric power generation by Pulangi IV - the largest hydroelectric power facility of the National Power Corporation (NPC) in Mindanao, located about 50 km southeast of Lantapan. Lantapan is thus, wholly contained within the Manupali watershed, which was declared "critical" by the Department of Environment and Natural Resources (DENR), making it subject to conservation and restricted development in 1992.

Lantapan's pattern of agricultural expansion involved the replacement of forest and permanent crops by annual crops, and the spread of annual cropping in high altitude and steeply sloping areas, pushing back the forest frontier. The rural economy remains agricultural, with 90% of the households depending on smallholder farming. The proliferation of agribusiness, particularly large banana corporate farms, utilizing prime agricultural lands and absorbing the local labor force, has pushed smallholders to farm in much smaller plots in less productive and more environmentally fragile areas.

Who needs what?

The position of Lantapan relative to MKNRP and the Manupali River lends itself to greater expectations in terms of environmental service (ES) provision. MKNRP is one of the biodiversity hotspots in the tropical world, and is claimed as ancestral domain by indigenous peoples. Serving as corridors of biodiversity, the well-vegetated ravines and agroforestry farms connects the bio-diversity rich MKNRP to the diverse agricultural landscape. Biodiversity conservation is thus an important ES. However, the economic importance of "water" is well-recognized, and was prioritized by stakeholders in terms of ES interventions. Stakeholders are defined relative to their locations in the watershed, and their corresponding need of the water service (Table 1).

Table 1: Water demand by stakeholder-groups

Landscape Position	Classification	Land use	Stakeholder	Water demand for:
1	Forest land - MKNRP Buffer zone	Production forest, agroforestry, water source, etc.	Buffer zone communities (migrants and IPs)	Producing crops and conservation of the buffer zone
			Protected Area Management Board (PAMB)	Maintaining the overall integrity of MKNRP
			Local Government Unit (LGU)	Tapping the spring for the municipal water system
			Banana plantation companies	Tapping the spring for irrigating banana plantations
2	A&D* - agricultural; upper section	Vegetables, trees, agroforestry, grasslands	Vegetable, tree and agroforestry farmers and households	Producing crops Domestic use
			LGU	Maintaining the economic viability of the municipal water system
			Banana Plantation companies	Maintaining surface water
3	A&D - agricultural; middle section	Corn, sugarcane, agroforestry, banana corporate farming	Corn, sugarcane and agroforestry farmers and households	Producing crops Domestic use
			LGU	Maintaining the economic viability of the municipal water system
4	A&D - agricultural; lower section	Corn, sugarcane, banana plantations, irrigated rice	Banana plantation companies	Maintaining surface water
			Corn, surgarcane and agroforestry farmers and households	Producing crops
			Rice farmers/irrigators	Producing rice
			Banana plantation companies	Irrigating banana plantations
			National Irrigation Administration (NIA)	Meeting irrigation targets
5	A&D - agricultural (Beyond Lantapan)	Pulangi reservoir	Hydropower plant - National Power Corporation (NPC)	Power generation

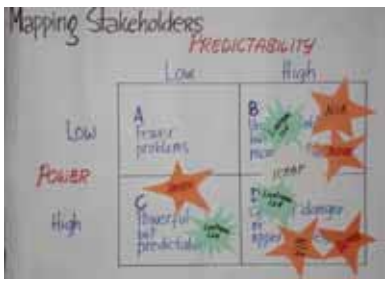
*Alienable and Disposable; privately owned

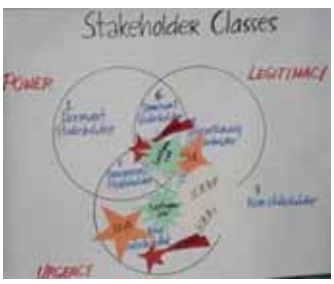
Stakeholders in the Manupali watershed vary in terms of their interest, legitimacy and power with regards to ES. The diversity of stakeholders and their interest makes the negotiation process complex and challenging, and success depend on the level of understanding of real issues and cooperation among stakeholders (Table 2).

Table 2: Stakeholders' interest, power and legitimacy

Stakeholder	Interest	Power	Legitimacy
LGU	H	H	H
NIA	H	L	H
Farmers	H	L	H
Agribusiness	M	H	H
ICRAF	H	L	H

Legend: High-H; Medium-M; Low-L



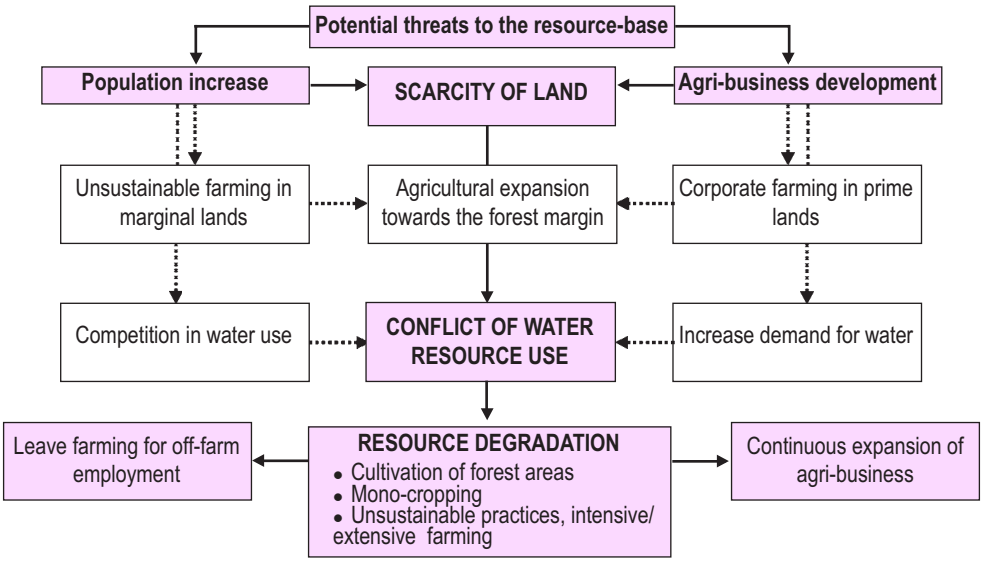


Stakeholders' Analysis

Who gets what? — the real issue

Dramatic change in land use has been observed over the last two decades, with pervasive conversion of corn, rice and coffee farms to sugarcane and banana plantations. These land use activities have both positive and adverse effects to rural livelihoods and the environment. The stakeholders analyzed the potential threats to the resource-base in Figure 1.

Figure 1: Issues and concerns in Lantapan



Issues regarding water demand in Lantapan

- **LGU** - expansion of the local water system, doubling the current volume requirement.
- **Farmers** - during peak dry months, vegetable farmers irrigate their crops by legally or illegally tapping from the LGU service pipe, or by pumping up water from the river. Farmers use rainverse or sprinklers to irrigate vegetable crops, which is an inefficient water management strategy.
- **Banana plantations** are tapping from major rivers and springs to irrigate bananas. With more than 1,400 hectares of banana plantation, the total water requirement for irrigation during dry months would be 840,000 LPS (at 600 LPS/ha). Thus, the growth of agribusiness puts competitive pressure on small holder farming when it comes to water use.
- **Irrigators (rice farmers)** suffer with low water supply during peak dry months, pushing them to plant other crops, or burying them with debts due to crop failure.
- **National Irrigation Administration** - due to increasing demand for water upstream, the efficiency of MANRIS is affected, reducing its service area and dis-servicing the rice farmers. NIA first acquired water rights in the Manupali watershed for 8,000 LPS. Currently, the maximum discharge is only 5,000 LPS. As a consequence, NIA is forced to irrigate banana plantations located within its service area to keep up its revenue collection. For five years, the silt deposit in the MANRIS canal reached 46,486 cubic meter, and to remove it will require 1,664,000 pesos or about US$ 41,000.
- **National Power Corporation** - downstream, the quantity of water in the Pulangi reservoir has significantly reduced, and with high silt deposit (26 million cu. meters for 26 years), the life span of the dam is condensed by half. With the current contract rates, NPC will need to put up 14 billion pesos to completely remove the voluminous silt from the reservoir— an extremely expensive replacement cost of the hydropower plant.

With rising populations and on-going expansion of agribusiness, it is more likely that smallholder farming will be pushed at the frontier, and demand for agricultural lands and production inputs such as water, will escalate rapidly. Clearly, the impacts of land use activities by residents and the agribusiness sector have been significant, reducing the efficiency of the irrigation system, and reducing the energy output of the hydropower plant.

Can sufficient water supply be sustained?

Despite this, opportunities exist to ensure continued provision of ES, given the stock of social capital developed through the long history of local government partnerships with communities and donor-funded projects in Lantapan. With very limited technical support, more than 1,000 farmers have adopted various soil and water conservation technologies, including agroforestry. Farmers have contoured their farms, planted trees and applied other conservation techniques. The positive impact of their land use activities would have been significant given their concentration in the steeper slopes and in the environmentally critical areas of the watershed. The LGU on the other hand, has intermittent watershed management interventions, while the banana plantation companies claimed to be using water efficient technologies, like drip irrigation, and have planted trees within their plantations. However, all these efforts are fragmented, un-coordinated and inadequate. Finally, stakeholders agreed that with coordinated efforts, Lantapan can ensure the sustainability of water supply both for their own benefits, and for outside users.

Collaborative efforts to develop a mechanism for PES

Stakeholders in Lantapan learned that with proper negotiation and incentives, hostile confrontation on the emerging water crisis can be avoided. The Municipal Government forged a "collaborative initiative" with the World Agroforestry Centre (ICRAF), Bukidnon Environment and Natural Resource Office (BENRO), Bukidnon Watershed Protected and Development Council (BWPDC), National Power Corporation (NPC), and the National Irrigation Authorities (NIA), to develop a PES mechanism in the Manupali Watershed.

Using shared resources, the collaborators outlined the activities, and are applying the processes and tools developed by ICRAF scientists in developing PES mechanisms. The experiences from RUPES sites in Southeast Asia provide useful lessons, to bear on the challenges in instituting *realistic, conditional, voluntary and pro-poor* PES mechanisms in the Manupali watershed.

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