ONE RIVER, DIVERSE LIVES: WHY THE 'ONE SIZE FITS ALL' APPROACH IN INTERVENTION MAY NOT WORK

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This paper describes the conditions of households along the different sections of Pagatban River in Negros Oriental that were categorized as 'downstream', 'midstream' and 'upstream' settlements for analysis, to show how the 'one size fits all' approach to addressing the environmental problems that confronted these households compares to site-specific intervention. The diversity of households in the three settlements in terms of demographic, social and economic characteristics may have been either the results or determinants of the quality of the river, which has been destroyed by continuing mining operations and logging activities in the upstream areas. Such diversity in human settlements and relationships with the river requires site-specific interventions that address distinct problems and priority needs of each settlement.

Keywords: *Human settlements, Socioeconomic diversity, 'One size fits all' approach, Site-specific intervention, Pagatban River, Negros Oriental*

Introduction

There are several approaches to introducing and effecting interventions to address environmental or developmental problems, each of which claims to be successful. One of such is the 'one size fits all' approach, which assumes that geographically-linked settlements or communities generally share the same problems, needs, and resources. Intervention strategies that had successfully worked in one settlement are seen to be more than likely to produce the same results if applied to its geographically-linked settlements (e.g. Purcell & Magette 2011, Broitman et al. 2012). It is also presumed that the benefits enjoyed by the primary target settlements will subsequently diffuse or have spillover effects to nearby settlements. These assumptions of

a 'one size fits all' approach are possible only if an effective enforcement mechanism has been set-up and is working to meet the goals of the interventions – a feature of a top-down approach to development (e.g. Zagonari 2007:803).

However the above approach to development is hegemonic in that it reflects the notions of core and periphery and of dominance and subservience. From a macro-perspective, these have kept Third World countries from growing according to their respective tempos, resources, and needs. Escobar (1992) earlier called for grassroots approaches to counter hegemonic development models by recognizing the relevance of local knowledge and culture as basis for redefining appropriate development programs for a particular group of people. The goal of localized development that grassroots social movements have been aiming for is seemingly consistent with the 'rural territorial development' approach which (according to Bebbington et al. 2008a), clamors against how local territorial concerns are treated as subordinate to the national development agenda, despite the trend towards decentralization.

As a policy lens, the 'rural territorial development' approach can meaningfully connect economic growth with institutional arrangements in order for the rural poor to ably participate in this growth process at a regional or local level (de Janvry & Sadoulet 2004;, Bebbington et al. 2008b).

At a micro-level, some development and environmental workers argue that a single general plan will not work for all territories even under similar circumstances. The 'one size fits all' approach does not consider the uniqueness of human communities, social institutions, and the complexities of social interactions in introducing interventions (e.g. Eder 2005; Fabinyi et al. 2010). The anthropologist James Eder (2005) in particular argues that in introducing environmental interventions, the plurality of human experiences and expectations has to be recognized. This is true for the case of marine protected areas (MPAs), which in some instances impinge on the traditional fishing grounds of subsistence fishers. Although there are instances where supportive local fishing communities have surrendered their traditional fishing grounds, I have encountered during fieldwork MPA-resistant fishers who felt that they were being displaced by MPAs from their sources of livelihood, given their limited capital and fishing technology (Oracion 2005).

The foregoing discussion illustrates how lawmakers often take a view that laws or ordinances will effectively work at all levels. But oftentimes one group or only a particular sector of the community is most benefited because of comparative advantage. The case of big vs. subsistence fishers with the establishment of MPAs in traditional fishing grounds is one example (Eder

2005). This raises the issue (often highlighted by political ecologists) of the basic rights of humans to live by having access to resources, and which is at times manifested in struggles between or among stakeholders, specifically the resource users and authorities (Adams & Hutton 2007). The insensitivity and failure of national leaders to recognize the creativity and ability of local leaders, as well as to consider local realities in designing laws that will be applicable to all, make them less efficient in terms of addressing complex problems. This is particularly so when some degree of local flexibility is not allowed in law enforcement or in the implementation of nationally-designed programs. According to Broitman et al. (2012), in the case of waste management, a top-down approach cannot effectively work unless each local authority is allowed to implement the mechanisms they find best-suited to their conditions. The role of national authority is only for setting goals and providing the guidelines—not setting limitations.

Addressing the national agenda, with solutions that are sensitive to local peculiarities and to the urgency of providing solutions to localized problems (rather than wait for the ripple effects of broadly designed programs), can be achieved by combining 'top-down' with 'bottom-up' or 'community-based' approaches and by tailoring programs to the specific needs and conditions of the target areas. Purcell & Magette (2011), in the context of waste management initiatives, call these 'site-specific interventions' or 'targeted intervention strategies' to contrast with the 'one size fits all' approach mentioned earlier. The same argument is noted in the context of community forestry programs, which according to Gelo and Koch (2012) should be designed to fit to the community in order to generate local participation in all aspects of management and give the program greater probability of success. But they warn that general local participation will be enjoyed by the program because different sectors in the community exhibit variable preferences in the demand for and value of resources, therefore resulting to variable support.

In the case of coastal resources management, Fabinyi et al. (2010) consider social complexity to be an important element in planning and implementation as well as in measuring the impact of environmental interventions. Distinct patterns of geographic distribution of people in settlements and the notion of territoriality over access to resources may result to increased social complexity. Moreover, since social complexity manifests a diversity of people with a multiplicity of needs and priorities, this already suggests that a'one size fits all' approach *may* not work at all times.

The settlements along a single river from upstream to downstream may be exposed to the same water source, but they may be differently affected by the opportunities and abnormalities in the water throughout the year because

of distinct spatial and economic variables that influence how households interact with the river. This topic is the focus of my paper and it will be explored here relative to the application of site-specific interventions to secure the quality of life of the people along Pagatban River in Negros Oriental.

Data from a socioeconomic survey among households settled along the different sections of Pagatban River (Oracion 2011) will be used to critique the assumptions of the 'one size fits all' approach against the principle of site-specific intervention in addressing social, economic and environmental problems that confronted these households. The survey involved a quota sample of 120 households equally distributed among three different sections of the river categorized as 'downstream', 'midstream' and 'upstream' (see Table 1). The survey allows a closer examination of the demographic, economic, and social diversities of the sampled households. Prior to the household survey, an ocular survey of the sites and in-depth interviews with some key informants were conducted to gain background information. The data from these interviews served as basis for the development of the survey questionnaire. Almost 65 percent of all the respondents were housewives. This was due to the frequent absence of husbands who were either out working in the farm or fishing during the survey.

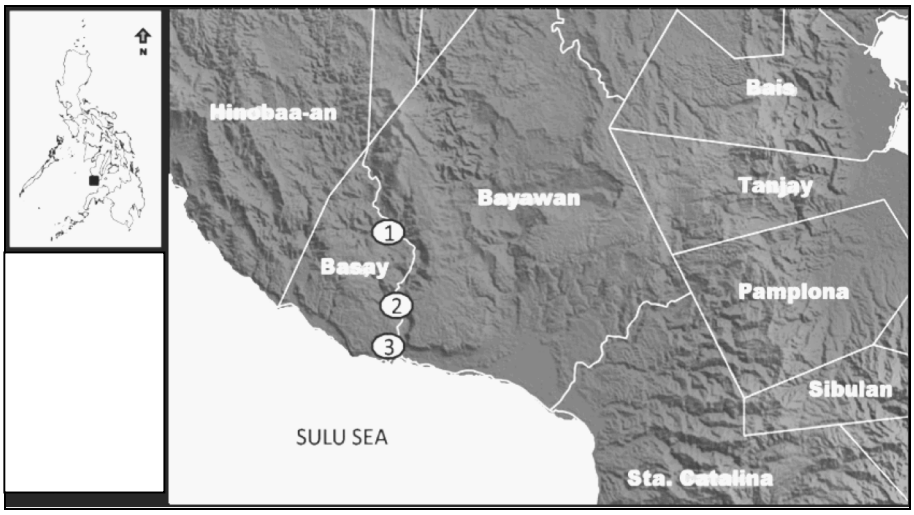
Pagatban River: the place and the people

Pagatban River lies between the town of Basay on the western side and the city of Bayawan on the eastern side. The riverbanks on the west are more favorable to human settlements and this may explain why the majority of the households surveyed were in Basay. Bayawan City is about 100 km Southwest of Dumaguete City, the capital of Negros Oriental (see Figure 1).[1] Basay, a former barangay of Bayawan and about 28 km south from it, is the southernmost town of the province. The economic activities in both places center on agriculture and fisheries, which indicate the particular importance of a quality environment in the quality of life of the people settled along the Pagatban River.

The Construction Development Corporation in the Philippines (CDCP) ventured into mining and operated in the mountain areas of Basay from 1979 up to 1983. The corporation was later renamed Basay Mining Corporation (BMC) to avoid confusion with its parent company which was taken over by the Philippine government because of loan problems. The production costs had risen steeply while the price of copper in the world market became very

[1] These are also the study sites of Bucol et al. (2011) and Guino-o et al. (2011). The Pagatban River serves as the natural boundary between Basay and Bayawan.

low causing major troubles for the continued operation of the company. During the crisis period, the CDCP was operated by the state-owned National Development Corporation (NDC). Its operation was finally ceased in 1983 when it appeared that it could no longer recover from financial difficulties. The company was foreclosed by the Philippine National Bank in 1984 for non-payment of its loan (Vigar et al. 2011:25).



Map from Bucol et al. 2011:93

Figure 1. The study sites along Pagatban River:
1) upstream, 2) midstream, and 3) downstream

The areas where the mine operated directly connect to the Pagatban River through the Mohong Creek. Although mining operations were short-lived, they had brought a significant economic boom to Maglinao, the barangay in Basay where the company directly operated, as well as to the town. When I visited Maglinao during the height of the mining operation, I saw the presence of several businesses, recreational facilities and housing units as many migrant workers came. There were a high school, a hospital and a paved airstrip that made the isolated barangay more alive than the town proper or *poblacion* of Basay. However with the closure of the mining company, those working in the mine suffered both economically and socially as families were displaced. Ecological disaster brought by mining was also evident. Currently, there are small-scale mining activities, explorations and pending applications to re-open the mine which will threaten again the recovering river (Balita 2011a; Mines and Geosciences Bureau 2012).

The barangays in Basay specifically covered by the study included Maglinao (upstream), Olandao (midstream) and Actin (downstream) because these have settlements within the three sections of the river. In Bayawan, these barangays include Tayawan (upstream), San Miguel (midstream) and Pagatban (downstream). The upstream barangays, with elevations ranging from 30-60 meters, have the largest land area compared to other clusters. Inversely, the downstream barangays, with elevations ranging from 12-18 meters, have higher population density. This means that the downstream barangays are more populated and their natural resources are more exposed to human pressure as compared to the upland barangays. This is notwithstanding the fact that the upland barangays and watershed areas supporting Pagatban River were very much altered by mining and logging operations which impacted negatively on the livelihoods of midstream and downstream settlements. In addition to mining impacts, Basay also topped the list of five illegal logging hot spots in this part of the province (Balita 2011b).

Table 1. Surveyed Communities and their Population Densities (NSO 2010).

Communities	Population	Area (km^2)	Density (population/km^2)	Location
Basay	24,913	162.00	153.78	
Maglinao	2,807	41.60	67.48	Upstream
Olandao	1,094	9.78	111.86	Midstream
Actin	2,391	7.58	315.44	Downstream
Total	6,292	58.96	106.72	
Bayawan	114,074	699.08	163.18	
Tayawan	5,585	111.96	49.88	Upstream
San Miguel	1,652	10.59	156.00	Midstream
Pagatban	1,980	8.52	232.39	Downstream
Total	9,217	131.07	70.32	

Many of the social features and economic activities of the surveyed households are related to the topography and to the locations of the settlements where they resided during the period of the study relative to Pagatban River. On the average, upstream households have more members (6.08) and are farthest (178.9 meters) from the river because of less favorable slopes and unfavorable terrain on which to build their houses. The upstream households were also the most recent settlers in the community (usually

moving from the neighboring *sitios* of the barangay), as compared to the downstream households which have fewer members (5.15), nearest (29.05 meters) to the river, and have been settled in the area relatively longer. The midstream households are characteristically in between the upstream and downstream households, with an average of 5.45 members and an average distance of 125.81 meters from the river. This is also evidenced by how households along the midstream and downstream sections have developed the lands they occupied. There are many fruit trees planted in these areas.

On the average, all the households surveyed have been residing in their respective communities for almost 19 years but the upstream households are more recently established (14.55 years) if compared with the downstream (21.53 years) and midstream (19.6 years) households. Although majority also of the households had not transferred residence from the time the couple got married, spatial movement is particularly significant among those in the midstream households as compared to those in the downstream and upstream sections of the river (Table 2). Furthermore, among those that had migrated, the midstream households had transferred a little more frequently (1.52 times) compared to the upstream (1.4 times) and downstream (1.4 times) households. This is perhaps due to the fact that the upstream area was formerly within the mining concession and some restrictions on human settlement may have been imposed in areas where mining directly operated.

Table 2. If Household Had Transferred Residence

Response	Upstream (%)	Midstream (%)	Downstream (%)	Total (%)
Yes	5 (12.50)	23 (57.50)	10 (25.00)	38 (31.67)
No	35 (87.50)	17 (42.50)	30 (75.00)	82 (68.33)
Total	40 (100.00)	40 (100.00)	40 (100.00)	40 (100.00)

Household migration appeared to be internal or localized, i.e. the movement is within the same barangay or town rather than from elsewhere or outside. The upstream households clearly manifested this migration pattern as compared to the midstream and downstream households. Taken as a whole, majority of the 37 households that had transferred residences moved only within the barangays (29.73%) and sitios (24.33%) of Basay and Bayawan. About 24 percent of those surveyed came from another town or city of Negros Oriental, about 14 percent originated from another province and only 8 percent hailed from another region. In all these movements the modal reasons are mainly economic or due to the nature and place of work.

Other related reasons are environmental such as to avoid the floods and pollution and to look for land to build a house of their own.

Economic and social diversity

In general, the upstream households have the least diversity of employment based on the number of reported livelihoods as compared to households in the lower section of the river. Based on the reported livelihood or income sources of the members of all the households surveyed, the majority considers farming as their major income source but this is more of the domain of the male compared to the female members. The proportion of the male members who are farmers is highest among upstream households (91.11% , followed by the midstream households 59.68%) . Only 14 percent of the male members of downstream households are farmers, while 61 percent of the downstream males are fishers. The downstream households surveyed are already close to the seashore and they fished more in the sea than in the river.

Table 3. Modes of Access to Cultivated Farms

Modes of Access	Upstream (%)	Midstream (%)	Downstream (%)	Total (%)
Inherited	16 (43.24)	8 (22.86)	6 (66.67)	30 (37.04)
Free use	-	18 (51.43)	1 (11.11)	19 (23.46)
Bought	17 (45.94)	1 (2.85)	-	18 (22.22)
Tenanted	2 (5.41)	8 (22.86)	2 (22.22)	12 (14.81)
Leased	2 (5.41)	-	-	2 (2.47)
Total	37 (100.00)	35 (100.00)	9 (100.00)	81 (100.00)

Although majority (67.5%) of all the households said they cultivated a farm during the period of the study, these were represented more by the upstream (92.5%) and midstream (87.5%) than the downstream (22.5%) households. Table 3 shows that majority of the upstream and downstream households owned the farms they cultivate while majority of the midstream households cultivate land for free in exchange for guarding the place. Meanwhile, there were more reported tenants in the midstream and downstream sections of the river. Although fewer downstream households cultivate a farm, the mean farm size (1.42 ha) is comparable with upstream households (1.44 ha). The midstream households have the smallest mean farm size cultivated (0.91 ha) since they did not own the land but allowed to

use a small portion for free. Therefore, they have limited access and right to develop or expand what area they already occupied.

Buying and selling of farm products (which requires capital) was reported as an income source only by downstream households particularly by the female members. Charcoal-making, mostly by male household members follows in the list of all household income sources. Coconut shells were commonly the materials made into charcoal by midstream households while upstream households used wood. The increase in the number of upstream households involved in charcoal-making because of limited livelihood opportunities implies more potential destruction to the remaining forest in this section of the river.

Fishing in the river is a significant economic activity based on the percent of households that fished during the past 12 months. They fish primarily for domestic consumption especially the households in the downstream section (83.33%) compared with the midstream (69.23%) and upstream (66.67%). However, fishing is a major livelihood for the downstream households and they sell their catch at the market. About 65 percent of all the households that fished used hook and line followed by fishing nets, spear gun and bamboo fish traps. They also engaged in scooping with their bare hands and in 'electro-fishing' or the use of battery-generated electricity to stun fishes (see Table 4).

Table 4. Common Fishing Gears Employed by Households

Fishing Gears	Upstream (%)	Midstream (%)	Downstream (%)	Total (%)
Hook and line	23 (74.19)	19 (50.00)	18 (75.00)	60 (64.52)
Fishing nets	6 (19.35)	22 (57.89)	12 (50.00)	40 (43.01)
Spear gun	20 (64.52)	5 (13.16)	2 (8.33)	27 (29.03)
Bamboo fish traps	9 (29.03)	6 (15.79)		15 (16.13)
Hand scooping	4 (12.90)	5 (13.16)	1 (4.17)	10 (10.75)
Electro fishing	2 (6.45)			2 (2.15)

On the average, the downstream households have the highest estimated monthly net household income (₱3,746), which is more than half of what the upstream households (₱1,660) and the midstream households (₱1,468), estimated they had earned for the same period. The difference is due to the variations in environmental quality and the diversity of economic opportunities and employment outside of farming and fishing which were available in the downstream section of the river. These were observed during

fieldwork and validated by biophysical studies (Rosario 1999, Bucol et al. 2011, Guino-o et al. 2011). The limited opportunity to gain higher education among household members in interior communities hampers their chances of seeking outside employment. These households are also limited in terms of opportunities to farm. The midstream households cultivated the smallest farms and this explains why they have the lowest monthly income. The economic limitations of these households likewise made them more vulnerable to natural hazards.[2]

The differential income of households subsequently determined their access to social services and the acquisition of household amenities. The educational attainment of household members six years old and above was solicited from the respondents to infer if their geographic location has some impacts on access to schools. Generally, only 7 percent of household members of school age are not in school or had not attended school, and the proportion is a little higher among the male (8.09%) than the female members (6.27%). The percentage with no education is higher among the midstream households (8.57) as compared to the upstream (6.25%) and downstream (6.99%) households. Accessibility of schools is influenced by distance: lack of of transportation and financial capacity explain why there are more household members in the midstream section that had not gone to school. The upstream and downstream households have government elementary schools within their respective communities or nearby. The children of midstream households have to walk farther or to cross the river to be in school, this may have discouraged some from pursuing basic education.

With regard to health conditions and access to health-related services, (among the measures of quality of life influenced by environmental and socioeconomic factors), the four most common ailments reported include fever, cough, colds, and influenza, and these were highest among upstream households where more extreme cold and heat conditions are experienced relative to the elevation of their settlements. The barangay health stations were the sources of health services most resorted to by households in all sections of the river, but the majority of upstream households preferred self-medication and traditional healers when they could not go to the health centers or the hospitals. Aside from financial reasons, the distance from rural health units and public hospitals, located in the town center, also explains why alternative medication and services tended to be availed of by upstream households.

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[2] Similar to households in traditional or indigenous communities (see Crittenden et al. 2003, Gaillard 2003).

Access to household amenities is likewise different among households in the three sections of the river (see Table 5). The upstream and midstream households did not only use the river for the water needs of their farm animals and for transporting farm products to the coast, they also depended on the river for their laundry water. They got their drinking water from undeveloped springs. Meanwhile the downstream households had piped-in water from developed springs. Distance of the water source may also explain why the majority of the upstream and midstream households did not have toilets compared to the downstream households; they use bushes, shrubs, river banks and mangrove areas for defecation purposes (which threatens the water quality of the river for bathing and fishing in all sections of the river).

Table 5. Household Amenities (Multiple Responses)

Household Amenities	Upstream (%)	Midstream (%)	Downstream (%)	Total (%)
Water Sources				
River	38 (95.0)	28 (70.0)	1 (2.5)	67 (55.83)
Faucet	-	3 (12.5)	33 (82.5)	36 (31.67)
Undeveloped spring	6 (15.0)	6 (15.0)	9 (22.5)	21 (17.5)
Ownership of Toilet				
Yes	3 (7.5)	17 (42.5)	30 (75.0)	50 (41.67)
No	37 (92.5)	23 (57.5)	10 (25.0)	70 (58.33)
Lighting Facilities				
Kerosene lamp	40 (100.0)	37 (92.5)	24 (60.0)	101 (84.17)
Electricity		4 (10.0)	17 (42.5)	21 (17.5)
Truck battery	2 (5.0)	1 (2.5)	5 (12.5)	8 (6.67)
Types of Fuel				
Firewood	39 (97.5)	38 (95.0)	39 (97.5)	116 (96.67)
Coconut palm		27 (67.5)	7 (17.5)	34 (28.33)
Coconut husk		16 (40.0)	10 (25.0)	26 (21.67)
Charcoal	8 (20.0)		10 (25.0)	18 (15.0)

Majority of the upstream and midstream households had only improvised kerosene lamps for lighting. In contrast. a good number of the downstream households had electricity. The upstream households rely more on firewood for cooking, while the midstream and downstream households have diverse

sources of fuel such as firewood, coconut shell, husk, wood, and charcoal. The cutting of trees for firewood for domestic use was as expected highest among upstream households. No actual production data on firewood and charcoal (from wood) are available, however the demand for domestic fuel and the need to earn cash income among upstream households by producing firewood and charcoal have clearly exposed the remaining secondary growth forest along the Pagatban River to more anthropogenic threats.

Perceptions on Environmental Conditions

The operations of the mining company in Barangay Maglinao and Basay have resulted to massive physical alterations of the mountains because of the networks of roads built and the open pit technology practiced to extract copper and other minerals. Mine tailings also destroyed the river ecosystem of Pagatban. After the closure of the mine, the once deep, pristine, and abundant water of Pagatban River became shallow and gray with siltation and sedimentation. Elderly residents and former mine workers told of how these materials have formed a thick muddy substrate on the river bed especially between the midstream section and downstream section or the estuary. The substrates were observed during fieldwork. Pagatban River is known to be a natural habitat of the Philippine crocodile (*Crocodylus mindorensis*) which, with the drastic changes in the biophysical and chemical composition of the river, was no longer sighted in the area after 1999 (van Weerd 2010; see also Lowrie et al. 1981 cited in Alcala n.d.).

The condition of the river has since improved according to the most recent water quality assessment done by Silliman University biologists (Guino-o et al. 2011) which revealed that the heavy metals in the waters are now below the detectable limit of 0.01 mg/L. The water quality is classified as "Class C", suited for aquaculture use. However, soils from the river mouth and banks show high levels of heavy metals (from 0.1 mg/kg – 242.8 mg/kg). Although the said study confirmed that the water quality has improved over the last two decades, the problems of erosion, flooding and pollution remain as pressing problems for settlements along the riverbanks. Meanwhile, there are high levels of phosphate and nitrate in the water due to agricultural and domestic chemicals, as well as *E. coli* content from human and animal wastes, particularly in the upstream and midstream sections of the river (Guino-o et al. 2011).

Given the above biophysical data as benchmark, the survey sought to validate the perceptions of the respondents as to whether they had felt the negative impacts of mining on the river or observed the changes in its condition several years after it had stopped its operation. Generally, the

respondents said that the quality of the river was poorer immediately after the closure of the mining operation up to 1995. These perceptions cut across households in the different sections of the river (see Table 6). In other words, all the respondents perceived that the quality of the river had improved when mining was stopped, but only after some years had passed. However, the perceptions were not uniform across sites. Respondents from the midstream section recorded the highest net rating of improvement followed by the downstream section. Those in the upstream section where mining had operated showed the lowest rating, which means that the perceived damage to the river due to mining activities was greater in this area or that the upstream portion of the river requires more time for regeneration.

Table 6. Mean Ratings on the Perceived Condition of the River and Available Forest Over Time

Periods Assessed	Upstream		Midstream		Downstream		Total	
	River	Forest	River	Forest	River	Forest	River	Forest
Mining closure – 1995	2.60	2.43	1.73	3.46	1.64	3.08	1.99	2.99
1996 – present	3.30	2.64	3.83	2.88	3.56	3.03	3.56	2.85
Net Ratings	0.70	0.21	2.10	-0.58	1.92	-0.05	1.57	-0.14

Note: They were asked to rate the condition from a range of 1 (worst) to 5 (best). The negative net ratings mean that the condition had deteriorated.

Meanwhile, the quality of the remaining forest areas near the riverbanks is generally seen to have deteriorated further after the closure of the mine. The mine did not only upturn the mountain and soil because it used open pit technology; it also cut down trees for building networks of roads and for the construction of offices and houses for its workers. The demand for lumber by the community established closed to the mine which had grown so rapidly because of the economic boom it had created (although short-lived) had put great pressure on the forest cover. The logging activities in the side of Bayawan had initially brought threats to the forest but the mining operation in the Basay side of the river brought the condition of the forest to a critical level.

My key informants opined that illegal logging for construction works, gathering of firewood and the making of charcoal at present make it difficult for the forest trees to recover. The over-all net rating given by the survey

respondents to the condition of the available forest up to the present is on the negative (-0.14). This is the difference in the ratings between the condition after mining closure up to 1995 and 1996 up to the present (see Table 6). Only the respondents from the upstream section have perceived the forest cover to have improved a little.

Flooding as major environmental threat

Flooding episodes of Pagatban River, including flash floods or short duration rush of a great volume of water and overflowing up to about a kilometer beyond the banks, which often happen during typhoons or heavy rains, were identified by respondents as causing loss of farm crops, human lives and farm animals as well as damage to farm land and houses (particularly those located immediately along the riverbanks). Across the different sections of the river, the upstream households mosts commonly cited the loss of farm crops. On the other hand, it is in the downstream section that damage to houses was considered as one of the serious reasons why flooding is threatening or destructive.

Majority of the households affected have learned to adapt and live with the swelling of the river and flash flooding events, which have been made worse by anthropogenic causes particularly mining and deforestation as discussed earlier. Mine tailings and the soil erosion from denuded hillsides have resulted to the heavy siltation of the river (Rosario 1999). During typhoons and heavy rains, households members directly affected constantly monitor the status of the river and they temporarily move to higher elevation along with their animals for safety, particularly those in the downstream and midstream sections of the river, and among the upstream households that reside in the lower elevation or along the riverbank.

Respondents recalled about 11 flooding episodes that had occurred in Pagatban River during the past 12 months prior to the study. Two of these flooding episodes were considered destructive by my key informants particularly in the midstream section and in the Bayawan side of the river. The houses on this side are nestled in a valley cut by the river unlike the houses in the Basay side which are situated in slopes, and therefore, elevated and protected. But even in the upstream section, some respondents reported that flooding reached their houses especially those situated in the lower elevation and closer to the river. While flash floods also occur in the downstream section, overflowing of the banks seldom happens because this is already at the mouth of the river. The silted and shallow portion of the river in the midstream and upstream section, which is narrower compared to downstream, are blamed for the swelling or overflowing of the river. Guino-o et al. (2011) considered the midstream section in particular to be a choke

point where a large volume of water accumulates from upstream during heavy rains.

The households that have experienced destructive impacts of flooding were asked how much this had cost in terms of loss of farm animals, crops, houses, and farm lands. None of the households reported that someone died due to the floods during the past 12 months but there were reported cases of drowning from other households not covered by the survey. The loss of farm animals accounted for the most significant part of the estimated monetary value they attached to their losses, and this was most serious among upland households compared to midstream households. None of the downstream households surveyed reported loss of farm animals. Damage to boats came next in the ranking of the costs incurred and this was reported only by midstream and downstream households.

Meanwhile, the total mean loss of farm crops was highest among the midstream households and followed by the upstream households. Damages to farm lands and houses were also higher among the midstream households. Again, these figures reinforce the earlier discussions that the midstream households, based on the total mean cost of losses and damages they incurred, were most seriously and badly affected by flooding and overflowing of the river due to their location especially those in the Bayawan side. This is closely followed by the upstream households while the least affected are the downstream households. The findings further show that river flooding and overflowing would always have negative impacts to agriculture.

Environmental interventions

For an overwhelming majority of the respondents, the closure of the mine in 1983 had led to the significant improvement of the quality of Pagatban River. This was a forced condition due to the bankruptcy of the mining company. This means that if the operation of the mine had been profitable and the management was able to sustain its production, then mining could have continued up to the present with worse environmental consequences unless appropriate mitigating measures were employed. The indigenous people (i.e. Bukidnon) in nearby communities where the mine could potentially expand were reportedly supportive of responsible mining because of its economic benefits (Balita 2012).

There were no significant efforts to rehabilitate the river and to replant trees in mined-out areas. These observations were also earlier reported by Rosario (1999:123) who blamed the abandoned mining site for the soil erosion, stream sedimentation, and water pollution that ended up in Pagatban River. Although there is no available data on firewood and charcoal

production which would enable us to estimate the amount of damage these have created in the area, the upstream respondents also considered to be alarming the present extent of firewood and charcoal making.

Given the urgency to introduce environmental interventions that are not only immediate or rehabilitative but also preventive of the perennial problem of river swelling and flash flooding, in the year prior to fieldwork there were no concerted community efforts toward this direction. In fact about 58 percent of the respondents commented that their barangay and municipal leaders have not acted to mitigate the problem. Majority of the respondents in the upstream (82.5%) and downstream (53.75%) households reported indifference on the part of local government officials toward the flooding problem. In the downstream section however only about 36 percent shared the same observation. Nevertheless, the respondents who did report seeing government officials addressing the problem, cited the barangay officials more than the municipal officials (who incidentally did not reside in the communities covered by the study). The latter were reportedly engaged only in rescue operations and in providing financial and food assistance whenever there were floods.

'One size fits all' vs. site-specific interventions

The current and proposed environmental intervention projects in the Bayawan-Basay watershed by the Department of Environment and Natural Resources (DENR), including those of the Provincial government of Negros Oriental, as reported by Rosario (1999:126) included reforestation, soil and water conservation structures, agroforestry and sloping agricultural land technology. The unpublished data from 1988 up to 2006 of the Community Environment and Natural Resources Office (CENRO) of DENR and the Environment and Natural Resources Division (ENRD) of the province based in Dumaguete City show various reforestation projects introduced in the mountain barangays near the Pagatban River. These reforestation projects and the production of tree seedlings were contracted by individual persons, associations of farmers, and organized indigenous people. Unfortunately, no available record would show the success or survival rates of the seedlings planted.

The above intervention strategies were generally designed not only to restore the denuded upland environment but also to provide income benefits to the local residents.[3] Although these were not primarily intended for

[3] Rosario (1999) wrote that the expected impacts are classified into physical (soil and water conservation, improved water quality, reduced stream sedimentation, improved

Pagatban River the expected impacts would hopefully influence the quality of the river system.

But "unless comprehensive rehabilitation and protection efforts are implemented", the said intervention projects are not likely to work (Rosario 1999:129). Rosario[4] added that this must be expanded beyond only one area in order to effect significant changes in the total quality of the watershed, and that means including the river system of Pagatban. Incidentally, when asked, my respondents said they had not seen or heard of any government-initiated environmental interventions in their respective communities to address the problems that are related to flash flooding and swelling of the river during heavy rains. A few, nonetheless, mentioned the reforestation projects identified earlier.

The aforementioned intervention projects of DENR appear promising since they were designed to improve the status of various ecosystems that comprised the whole watershed areas, and eventually restore various ecosystem goods and services and ultimately enhance human security (informed by the direct link between ecosystem quality and human well-being [*see* Millennium Assessment 2005]). However it is certainly anchored in one of the assumptions of the 'one size fits all approach': the rippling effects of intervention are expected to be felt by nearby areas. Conditions and characteristics of people, however, even in adjacent areas, may not necessarily be alike, in the same way that the resources they need may be variable. Hence the interventions introduced in one area may not be appropriate and acceptable to all areas.

This means that the participation of people in implementing intervention projects is dependent upon a series of connected factors rather than a single factor (Purcell & Magette 2011). Site-specific interventions corresponding to the unique conditions and experiences of households along the different section of Pagatban River are urgently needed.

The aforementioned intervention projects of DENR for example are more appropriate in the upstream section of the river, which must have been the target when these projects were designed. Majority of the upstream

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aesthetics, enhanced fertility of land), biological (increased timber production, enhanced vegetation and soil cover, enhanced wildlife habitat and wildlife production, increased production of aquatic resources) and socioeconomic (employment, increased economic activities, better education of children, better living condition and related others).

[4]Rosario's team had assisted in the preparation of the management plan of the Bayawan-Basay watershed.

households (like in the downstream section), are cultivating their own farms and can freely make decisions on what to do with them compared to households in the midstream section that typically lived in someone else's land. Only one out of five midstream households owned the relatively small farms they cultivated (of less than a hectare on average), while the upstream and downstream households typically owned larger-sized farms (of about one and a half hectare).

There are distinct structural barriers, therefore, in introducing intervention projects to midstream households. Because of limited farm space, midstream households may be also have been more cautious about planting trees on land which they have to prioritize for food crops. Without tenure over land, they could not opt for reforestation or agroforestry; the majority of them were only being allowed free use of the land they were cultivating, while a few were just tenants. Physical or mechanical interventions could help secure from calamities the farm-based interventions such as gardening and animal production for the improvement of household income, particularly those in the midstream section, which reportedly earns the least among the three groups of households along the river. While river rehabilitation through dredging to remove sediments, widening of the river in the choke points along the midstream section, and the planting of trees and bamboos along the river banks to prevent further soil erosion are needed, the absentee landowners would have to be consulted and involved. My key informants gave a gesture of indifference indicating 'what can they do?' to help prevent the overflowing of the river or the destruction of the riverbanks except for moving away from the river when danger is imminent.

Meanwhile, for upstream and midstream households, efforts to reduce *E. coli* levels in the river through information, education and communication (IEC) about building toilets have to be intensified so people will not defecate anywhere and contaminate the river. Households in all sections of the river also need to properly dispose of their domestic and agricultural wastes, which have added to the pollution the river currently experiences. Improving the water quality of the river would restore the supply of riverine food resources as well as ensure the safety of human consumers.

One could go on enumerating possible interventions (but these demand appropriate studies beyond my expertise). As I have emphasized, the diversity of human settlements and activities in the different sections of the river—the peculiarities of households and the spaces they occupied for subsistence—call for site-specific interventions rather than the 'one size fits all' approach. Site-specific intervention, which is consistent to the 'bottom-up' or 'community-based' model of development, requires seriously

involving the communities and households that would be directly affected. Prioritization of the problems and the corresponding interventions have to be done in consultation with the community, and any decisions must be evidence-based in order to address those that are more pressing in terms of range and urgency, given the limited resources of individual households, the government, and of concerned environmental organizations.

Conclusion

I have demonstrated the diversities in the demographic, economic, and social conditions of households settled along the different sections of Pagatban River that was damaged primarily by the mining operation in the past and the perennial illegal logging activities for construction, firewood, and charcoal. The research design of categorizing settlements as 'downstream', 'midstream', and 'upstream' had brought out the differences in the characteristics of households and the geological and hydrological features of the different sections of the river. There are distinct differences between the different categories of households in terms of the demand for food, ownership of land, available capital and opportunities for livelihood, access to social services, risk of exposure to flash flooding and overflowing of the river, and other related problems. These distinctions highlight the limitations of the 'one size fits all' approach that is currently used in interventions of the government to restore the ecological balance of the Bayawan-Basay watershed that connects with the Pagatban River.

The upstream, midstream, and downstream households have different priorities and capabilities that need to be addressed and harnessed, respectively, in order to maximize the utilization of limited resources of the government for addressing their problems. In introducing or effecting intervention strategies to address the environmental and economic problems of these households however, the interventions fail to consider or respond to the peculiarities of the households located in the different sections of the river.

Interventions have to be localized and must be designed with the meaningful participation of the local people so they can claim meaningful ownership to ensure greater success. Reforestation projects involving the community may aid in restoring the quality of the watershed, but if the people contracted were in it only for the money they would be less concerned about the results and outcomes of these projects. In order to test this kind of contention (which incidentally was not the primary objective of this paper), it is suggested that the impact of the existing reforestation projects as well as the other related intervention projects in Bayawan-Basay watershed be

studied in the future. Such a study should aim to determine if these meet the requirements and targets of a site-specific approach within a rural territorial development framework, examine how and in what forms the various intervention projects have contributed to the improvement of the various areas covered by the watershed, as well as benefited the households that are settled in different sections of the river.

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