

THE WATERSHED OF BAIS CITY

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INTRODUCTION

One of the two most highly biodiversified ecosystems of the earth is the tropical moist forest. The forest as an ecosystem supports millions of species (IUCN 1990). Its severe alteration by man brings about the most disastrous effects to the entire earth's ecosystem, including the marine ecosystem. The loss of species diversity due to habitat disappearance on account of anthropogenic activities is tremendous, not counting the effects on climate, shelter, water and food supply.

A Critical Ecosystem

From the information given by a staff of the Department of Agriculture (DA), the Bais City watershed is one of the most critical watersheds in the country today. The original watershed occupied an area of approximately 13,500 ha with coordinates of 9°30' - 9° 40' N latitude and 123°01' - 123°06' E longitude. The present watershed protected area is reported to be a much reduced area of 1,129 ha with coordinates of 9°33' - 9°36.5' N latitude and 123° 01' - 123° 02.4' E longitude.

The truth of this observation is reflected in the fact that the municipalities surrounding this particular watershed, have people buying water in plastic gallon containers. A common sight in Okiot is teen-age boys and girls pedalling 4 or 5 big containers of water bought at 25 centavos per gallon (from houses supplied by the Bais City Waterworks System) and sold at 2 pesos per gallon to the consumers. At this writing, water-vending is a booming business among young people of the Bais City suburbs. Demand for this scarce resource is intensified as river water is directed to impoundments for irrigation of plantation crops. Competition for this important commodity is just one of the many problems of the watershed's loss of integrity. Erosion of topsoil due to flash floods resulting from absence of water absorbing system of the roots necessitates heavier demand for soil fertilizers. Eutrophication of bodies of water and siltation may also result from erosion of topsoil (with fertilizers) endangering the life of river and bay organisms used by the townspeople for food.

From unstructured interviews of the waterworks superintendent, there are three major uses of water in Bais City: 1. domestic, 2. irrigation, and 3. industrial.

Domestic Uses

At this writing, there are 1,700 subscribers that are supplied by the waterworks system. There are about 14,430 households in Bais City. Therefore, the number of subscribing household is only 12%. Yet the discharge rate of the waterworks water source in the Panamangan impoundment which is 600 gpm can hardly meet the demands of even the subscribers. Therefore, those households which do not own any private water system rely mainly on rain and water bought from water vendors.

The waterworks intake box at Katangkatang is filled from the spring water of Panamangan River, tributary of the headwaters in Tindug Bato, Lighi, Mabunao.

Irrigation Source

To irrigate 12,000 ha of sugar land is a water-intensive activity that needs a systematic impoundment of water. According to a key informant, about 10 major farms are supplied from the river water. This is especially active during the planting season from May to October.

Industrial Uses

The two most heavy users of water are the sugar milling plants and the prawn pond industry. The sugar mills' water supply comes from the deep well drilling made by the plant.

The prawn ponds draw water from the Tamogong river which in turn draws water from the same headwaters.

The single most important cause of the watershed reduction is the intensive conversion of the secondary and perhaps primary growth forest to sugarlands, according to a source at the Department of Environment and Natural Resources (DENR). Most of the small-time sugar planters are encouraged to utilize every nook and cranny of the Alienable & Disposable (A & D) lands (even those with 30-40% slope) of the watershed area for sugar farming by loans from the Land Bank of the Philippines, according to the DENR and DA sources. Within the DENR watershed rehab area though, A & D lands constitute only 5% (this figure is however increasing rapidly) and 95% are non-A & D. Outside the watershed rehab area all lands are presumed to be 100% A & D, except those converted to

land areas for schools, roads, and houses. But even inside the rehab area one could find several patches of A&D lots planted to sugar cane.

So critical has the situation become (the remaining forest cover is only 10%) that the DENR thought it wise to establish the present watershed rehabilitation project at Lighi, Mabunao, Bais City. The watershed area comprises 1,129 hectares. The project aims to protect the remaining vegetation cover and to rehabilitate the watershed through the following measures:

a. introducing exotic species such as:

1. Mahogany (<i>Swietenia macrophylla</i>)	55, 434 trees
2. Gmelina (<i>Gmelina arborea</i>)	56, 955 trees
3. African Tulip (<i>Spathodea campanulata</i>)	730 trees
4. Fire tree (<i>DelOnix regia</i>)	730 trees
5. Giant Ipil-ipil (<i>Lucaena leucocephala</i>)	51, 000 trees
6. Kakawete (<i>Gliricida sepium</i>)	51, 000 trees
7. Pink Shower (<i>Cassia javanica</i>)	5, 000 trees
8. Jackfruit (<i>Artocarpus heterophylus</i>)	1, 700 trees
9. Wild Sun Flower (<i>Helianthus annuus</i>)	17, 000 plants

b. introducing agroforestry scheme

c. establishing watershed rehabilitation structures, like:

1. checkdams -- to slow down the water flow. There are 40 such checkdams erected along Tamogong river, Sayao-sayao and Manakit creeks.
2. rockwall/retaining wall -- to prevent erosion and increase the water absorption capacity of the root system of trees. There are 2,800 cubic meters of these structures established.

Upon ocular inspection, one finds a greater number of trees along creek banks and watercourses as one goes closer to the headwaters. The riparian zone's rehabilitation (as well as its flood plains) is very important to avert the erosion problem and siltation process in streams and rivers, which can be exacerbated by frequent flooding during heavy rainfall. Irrigation water can cause bodies of water to undergo eutrophication and algal bloom as mentioned earlier.

The farther one is from the headwaters, the sparser are the stands of forest trees until only sugar cane plants can be found even in about 30-43% slope.

Few patches of vegetable and flower gardens can be found in areas where there are houses. From personal communications, a DA personnel claimed these gardens are part of the livelihood project for the baranggay residents.

No evaluation of the rehabilitation's structural efficiency has been done yet, according to the former information officer of the Bais City Watershed Rehabilitation Project, Ariston Cardano.

Lake Mangganay/Lake Manticanon

The health of the watershed area is most often determined by the health of the bodies of water in its midst, i.e. the lakes, the rivers and streams. When referring to an ecological system, this health is popularly called "biotic integrity." It is defined by Karr and Dudley (1981) as the "ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region".

For example, the watershed degradation will also mean its lake's degradation. There are a number of indicators to reflect the latter's loss of biotic integrity: algal bloom, predominance of exotic species, damaged fishes, decrease in number of species, etc. (Karr et al., 1986). Therefore, looking at the health of the fish communities will give one an indication of the health of the larger ecosystem where the body of water habitat of these fish belongs.

At Sitio Mangganay, around 4 km from the headwaters, one can find a fairly big lake, which is estimated by a local informant as one hectare in size during the peak of the rainy season. During the height of the dry season, the size is reduced to one half, the same informant claimed.

The lake is an important habitat for the protein source of the surrounding sitios (a political sub-unit of the baranggay).

There are native and introduced species in the lake. The introduced species include goldfish, gurami, tilapia, carp, catfish, and rainbow trout. The native species comprise the eel, mudfish, and mullet. All the information given by the informant Sotero Tamundo, should be confirmed. He claimed that a few of the sitio households constructed man-made lakes and stocked them with fish fry from the natural lake. Pollution may be a hazard to reckon with to sustain the biotic integrity of the lake but drying up is the worst thing that can happen when the watershed loses its identity as an ecosystem. There are only 1,199.00 ha of forest left (Table I). When the watershed ceases to be, the catchment area (after a heavy rainfall) becomes useless as waterflow velocity tends to be unchecked, carrying silt, sediment, and nitrates to the different bodies of water jeopardizing aquatic life.

Table I. Land use statistics of Bais City

<i>Land use vegetation</i>	<i>Area(ha)</i>	<i>Percent(%)</i>
Industrial	38.02	0.15
Residential	58.88	0.23
Commercial	1,247.80	4.97
Fishpond	503.00	2.00
Forest	1,199.00	4.78
Paddy rice irrigated	5.00	0.02
Paddy rice non-irrigated	87.88	0.35
Banana	738.00	2.94
Corn	3,120.00	12.43
Coconut	3,060.46	12.19
Sugarcane	9,056.00	36.07
Mango	11.00	0.04
Pineapple	7.00	0.03
Grasses/Shrubs	5,163.78	20.56
Ipil-ipil	5.00	0.02
Bamboo	79.00	0.31
Mangrove	283.00	1.13
Pasture Land	161.90	0.64
Nipa	29.00	0.09
Rootcrops	82.00	0.03
Vegetables	21.00	0.08
Build-up	157.44	0.65
TOTAL	29,109.16	100.00

(Source: DA, Bais City)

SUMMARY AND RECOMMENDATIONS

On the whole, an efficient water management system is imperative for the equitable allocation of water to various end users: farmers, cultivators, household consumers, plantation owners, prawn-pond operators and the like.

But the efficiency of such a system hinges on the reliability of the water supply which in turn depends on the stability and sustainability of the water-absorbing capacity of the root system of the forest in the watershed. Only then can run-off water and soil from the fertilized fields be checked and the damage done by the erosion, siltation, and sedimentation of the bodies of water arrested.

Therefore, a recommendation seeking to study ways to reach an optimum balance between rehabilitating the watershed and sustaining the productivity of farmers and wage earners in plantation crops is in order.

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BAIS BASIN COORDINATING BODY

Executive Committee

Bais City Mayor	:	Hon. Francisco Villanueva
Tanjay Mayor	:	Hon. Arturo Regalado
Manjuyod Mayor	:	Hon. Jose Baldado
Non-Govt.-Org.	:	Roberto Raymundo
Government Org.	:	Alfredo Maturan
Community-base	:	Fernando Eregil
Silliman University	:	Dr. Betty C. Abregana

TASKS

1. The executive committee will look at the priorities identified in terms of research agenda and development agenda.
2. The members of the executive committee will invite other agencies both government and non-government as well as people's organization to join in the development effort.
3. Convene the Executive Committee so that they can review the documents - the result of the workshop and so Silliman University may consult with the other members of the Executive Committee as to the best time to meet with the Coordinating Body.

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