Watermaster helps control Sipalay flood

By Ric Q. Labarda Sr, managing director of Prosperity Allied Machineries Enterprises (PAME) in the Philippines

The city of Sipalay in the province of Negros Occidental, located in the southwestern part of Negros Island in the Philippines, has a long history of land use that contributed to the degrading state of its watersheds.

Being a highly mineralised area, mining exploration was the first and major industrial venture that prompted the operation of two mining companies in 1957. However, these operations have been suspended since 2001. And from 1960 to the early 1980s, three logging companies were also operating in Sipalay and the adjoining municipalities.

The combined operations of mining, logging and kaingin (slash & burn) farming resulted in significant changes in the upland landscape. Open-pit method of mining exposed many areas to erosion and generated a lot of earth spoils and mining waste, which found their way into Sipalay river. Although mine tailing ponds had been established, breaching and spillage still occurred releasing large volumes of mine tailing into the river system and were subsequently deposited in the coastal area. Much of the accretion occurring along the coast was attributed to the mining waste that had accumulated over the years in the coastal zone. In addition, logging activities led to the denudation of the watershed, reducing its capacity to prevent flash floods and increasing the level of erosion.

Sipalay flood in 2002.

Flood and damages

Four serious typhoon/flooding events, occurring in November 1990, August 1994, October 1998 and November 2001, resulted to disruption in the overall socio-economic environment including:

a. Fatality or death due to drowning, extreme injuries.

b. Morbidity cases from wounds and illness related to flood water exposure.

c. Indirect effect on environmental health from contamination of water sources and exposure to polluted waters.

d. Damage to housing and personal properties, and consequent dislocation of families.

Watermaster Classic III, a Finnish made multipurpose dredger.

Watermaster suction dredging in the bay area.

In addition, flood relief operations and assistance required the utilisation of resources that ran into millions of pesos, which otherwise could have been channelled to more productive and other pressing needs of the city government.

Formulation of flood mitigation measures

In the light of continuing and worsening problems of flooding and devastation, the city government initiated measures spearheaded by the City Mayor Oscar C. Montilla. The city council then passed a Resolution on August 2002 approving the hiring of a consultancy group to conduct a thorough study of the flooding. The hydrographic survey of the Sipalay river and the topographic survey of the flood plain of the city provided a more

The Watermaster`s cabin.

in-depth analysis of the flood occurrences in the area. Thus a two-fold set of measures was adopted to be implemented over the short-to-medium and long-terms.

1. Short-to-medium term measures:

- The dredging of the Sipalay river channel from its mouth up to about 1 km and a half upstream, which would increase the present capacity of the channel to facilitate more efficient transport of water towards the sea. This measure also involved maintenance dredging works.
- Construction of a cut-off channel upstream to shorten the Sipalay river channel by about 1 km and produce a man-made oxbow lake corresponding to the present northbound bend.
- Widening of cut-off channel
- The rivetment and slope protection works at critical river sections
- The necessity of reinforced dikes along the eroding outer side of Sipalay river.

2. Long-term measures:

- Reforestation
- Land use policy / policy reform
- Institutional development
- Community mobilisation/preparedness programmes.

The implementation of mitigation measures

A. Ground civil works

In early 2002, the construction of dikes, elevation of riverbanks and cut-off channel went carried out immediately after securing all pertinent Environmental Compliance Certificate. This was assisted by substantial number of construction equipment from the city government including big bulldozers, wheel loaders, backhoe excavators, road rollers and a fleet of dump trucks.

B. Dredging works

The dredging component of the project was the biggest challenge due to an instant high capital financial outlay requirement. In addition, a special type of equipment was needed to perform various jobs. The perceived financial burden to the city for the purchase of the dredging machine created a strong opposition from some members of the city council. Thus the recourse at that time was for the city government to rent a dredger as recommended by other dredging contractor and equipment dealers.

It was at this juncture that a Finnish-made dredging machine, the Watermaster, was presented to the council en-banc. The unique features for multi applications, including suction and backhoe dredging, pile driving, the capability of moving in and

The Watermaster performing suction dredging in the river mouth.

End of the discharge pipe.

The new channel.

out of the water without crane assistance, were thoroughly scrutinised by the city council with the technical assistance of city engineers.

The Bids and Award Committee also insisted on seeing the machine operating on the site. So a visit to the jobsite at San Fernando in the province of Panpanga was arranged, where three Watermaster machines of the Department of Public Works and Highways (DPWH) were working. The performance of the machines met the expectation of the visiting group and after a confirmatory review of the investment, including operating cost vis a vis return of investment, the group finally recommended the purchase of one unit for the project.

In May 2003, the Watermaster Classic III was delivered to Sipalay City and after the assembly and test run, operators and maintenance technical training was conducted by Watermaster factory engineer at the site. Dredging operations started soon

Since the completion of the dredging work, the city of Siplaya has been spared the perennial flooding and devastation.

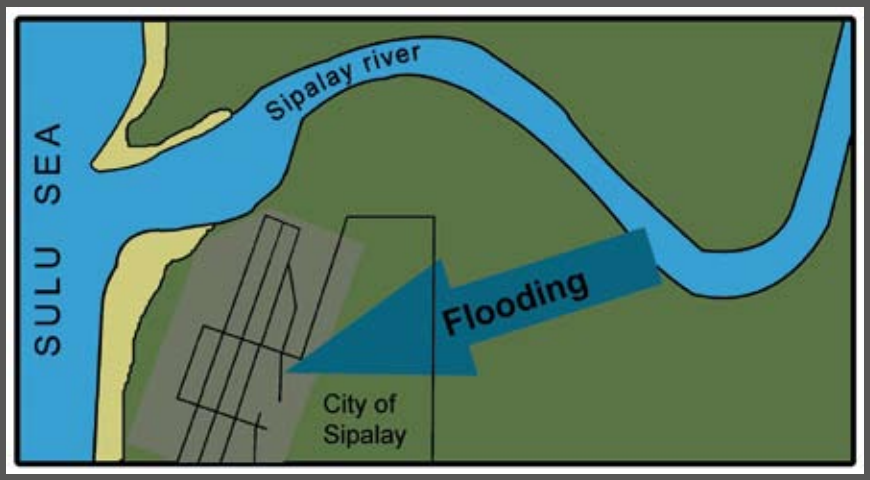
after that. PAME was the company responsible for the Watermaster service in Sipalay and all other units in the Philippines.

While dikes on the west side of the river were built by filling materials to elevate river bank, widening and excavating river channels and other civil works were done as planned using available land-based equipment.

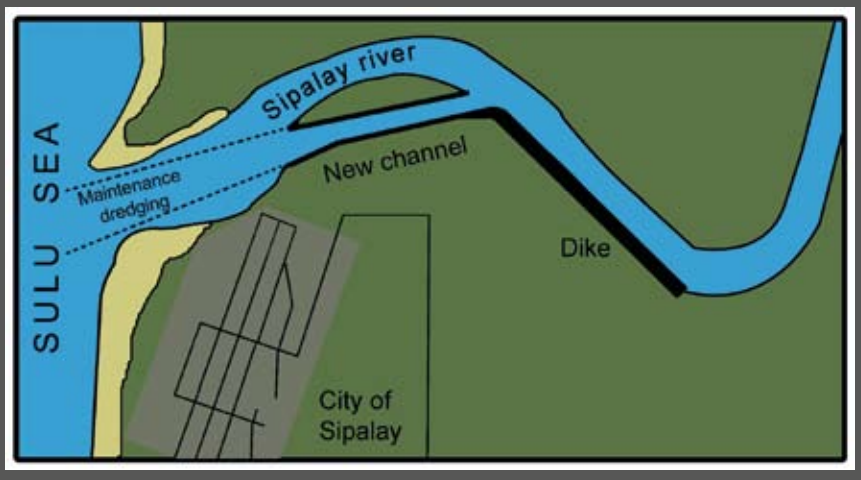
On the other hand, the Watermaster started dredging the bay area at the river mouth and continually moved upstream. Dredged material was pumped on the shoreline to reclaim and elevate the land.

After dredging for a while, the machine opened up the new 400 m long river channel towards upstream. Here, the Watermaster backhoe dredging was applied to lift the materials from the channel centre on the sides. Excavators on the sides assisted in finalising the new channel banks. During the work, the channel had 0-1 m water depth all the time, but this did not cause any problem to the Watermaster.

The Watermaster carrying out a maintenance dredging operation.



The Sipalay river before the dredging work.



The Sipalay river after the dredging work.

Environmental and social impact

The major part of the project was completed within one year, in 2004, and its mitigating effects could be felt immediately after the heavy rains / typhoon occurring in 2004 and 2006. The city was spared the perennial flooding and devastation to the relief and security of the general populace, significantly alleviating the sufferings of the city inhabitants.

Apart from arresting the devastation as a result of flooding, the project has also provided means of livelihood to the locals who are hauling and selling the dredged sands to be used in the manufacture of concrete hollow blocks. And the widening and continuous dredging on the mouth of the river has provided easy access to the small fishermen going in and out from the mooring place, making it easier for them to sell their catch.

In addition, the widened and longer shoreline due to the continuous dredging reclamation has induced private entrepreneurs to set up shops for dining and entertainment, which in turn has boosted local tourism. Such economic activities raise hopes for a better future for the city.

To date, the Watermaster has already logged in about 11,000 operating hours and has dredged vast amount of silt and sand. The machine carries out maintenance dredging operation in the bay area at the mouth of the river every year. ■

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