National Economic and Development Authority
(NEDA) Caraga

Final Technical Report

On the

Impact Assessment of the Lower Agusan Development Project - Flood Control Component (LADP-FCC)

Foundation for Rural Enterprise & Ecology Development of Mindanao (FREEDOM), Inc.

2019

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I. EXECUTIVE SUMMARY

The report summarizes the findings and analysis of the impact assessment done by including unintended benefits arising from the flood-mitigating project in Butuan City. The said project is situtated at both banks of the end-section of the Agusan River titled the **Lower Agusan Development Project - Flood Control Component (LADP-FCC)** implemented by the Department of Public Works and Highways (DPWH) for the period of 1988 - 2007.

PROJECT BACKGROUND

The flood control project is a component of the Cotabato-Agusan River Basin Program (CARBDP) established in 1978 under DPWH through Presidential Decree 1556 to develop the river basins of Cotabato River and Agusan River. LADP-FCC was implemented in two phases. FC-Phase I from 1988 to 2000, while FC-Phase II from 1997 to 2007. The total project cost was P5.557 billion funded through a concessional loan provided by then Bank of Japan of International Cooperation (JBIC), now the Japan International Cooperation Agency (JICA) under the Overseas Economic Cooperation Fund (OECF).

The flood control structures, built along the banks of the Agusan River where it traverses Butuan City, in the form of earth levees on the east bank and reinforced concrete floodwall and earth levees on the west bank were constructed to increase the development potential of the region by protecting Butuan City and its surrounding areas from flooding and by introducing more intensive agricultural production through irrigation. Historically, floodwaters have inflicted damage to properties and businesses, and the unavoidable evacuations of residents during monsoon seasons and tropical depressions, which has besieged the area since the 1920's or earlier.

RESULTS AND ANALYSIS OF THE IMPACT EVALUATION

The quantitative indicators used in determining the impact of the LADP are relevant to the study objectives are the physical outputs, the area protected from flooding, the number people directly benefitted by the intervention, economic condition, changes in land use, health and population, resettlement sites and settlers, and overall welfare of the people (men, women and children) including those still living in the floodway.

Flood Control Structures (FCS). On the east bank, the earth levee is 12.1 kms long and the cut-off channel is 6.2 kms long (including improvements of creeks and small rivers).

On the west bank, the floodwall that traversed the former downtown area is 4 meters high from the ground and 5.4 kms in length which provided protection to the commercial business district. The floodwall is connected with earth levees at both ends. The earth levees are at 4 meters high with an aggregate length of 10.3 kms, thus a total of 15.7 kms of FCS protection.

Improvement of Urban Drainage System. Flood mitigating measures for run-off water within the protected area are addressed through the improvement of the urban drainage system and the construction of cut-off channels. On the east side, local rainfall is drained by the 6.2 km cut-off channel from Mahay into the improved Banza River and finally into Butuan Bay. On the west side, which is the downtown area, the local rainfall is drained through the improved Urban Drainage System and finally into Butuan Bay via the improved Masao River and Agusan Pequeño River. Although there are places near the floodwall in the protected area that still experience flooding not from Agusan River but from rainwater that are unable to drain into the project's drainage system as the area has a generally low elevation.

The LADP Protected Area. The FCS have protected an area of approximately 294.72 km^2 on both sides of the Agusan River. A total of 46 barangays (out of 86 total barangays of Butuan) directly benefit from the flood control structures and improved urban drainage system.

According to the 2015 census, Butuan City has a population of 337,063 people in approximately 65,642 households. Population density is 410 persons/km^2. In 1997-2010 CLUP, the projected area for residential purposes is 26.61 km^2 which would make the population density today at about 827.5 persons/km^2.

Current estimates sees the east bank levee provide flood protection to approximately 10,830 households with a population of 45,161 individuals. On the west bank, there are about 1,500 business establishments that benefitted from the FCS, and approximately 14,377 households with 68,580 residents.

The improved Urban Drainage System benefitted 18 barangays covering an area of 66.76 km^2 with a population of 106,481 in approximately 25,535 households. The population density is 1,594 persons/ km^2 which is greater compared to beneficiaries of the FCS since the network of canals (surface or underground) traverses highly populated areas. The total population that directly benefit from the flood control and improvement of urban drainage systems represent 66% of the total population of Butuan City.

Economic Gains. The number of businesses registered from 2010 to 2016 was 6,772 to 9,707, respectively with a total capitalization of Php 3,518,697,554.61 in 2010 and Php 7,711,311,847.71 in 2016.

Butuan City's annual regular income in 2016 per BLGF data reached Php 1,537,341,402.56. On the same year, the City Treasurer's Office reported that annual sales reached Php 23,659,706,974.70

In 2012, the Philippine Deposit Insurance Corp. (PDIC) reported that total bank deposits in the city is at Php 13.15B which is 41% of deposits in Caraga. In 2018, the total deposits in Caraga reached Php77,870,494,000.00, while Butuan City posted Php28.506B which is 36% of deposits in the region.

The GRDP showed an increase in the regional economy by as much as 35.29% in 2011-2012. In 2014, the GRDP increased by 14.63% from the previous year. The GRDP closed the year 2017 with an increase of 115% after a decreased performance from 2015 to 2016.

By 2014, the local income is reach P513,870,000.00 or register a growth of 55%; and total income (including IRA) is P1,515,970,000. Butuan City was ranked 4th and 16th Most Competitive City for the years 2012 and 2014 by the National Competitiveness Council of the Philippines.

A counterfactual study was conducted on two communities, Barangay Mahay (Butuan City) as treatment group and Brgy. Hawilian (Esperanza, Agusan del Sur) as comparison group. Both communities are located by the banks of the Agusan River separated 30 kilometers apart, experienced the same flooding episodes, and statistically similar. The study showed that the former's economy has progressed expeditiously more than the latter over two time periods in the study, 1980-1988 (time1 - before LADP) and 2010-2018 (time2 - after LADP). Putting all indicators equal at time1, the growth trajectory of the treatment group showed a better outlook in the overall condition of its people after LADP was implemented.

Unintended Outcome. A population shift occurred in the vicinity or in barangays directly affected during the implementation of the (west bank) project most notably in the city center which was once the *poblacion*, a highly residential urban area. The CLUP (1997-2010) showed significant population dips in 27 urban barangays like Sikatuna and Urduja at -92% and -86%, respectively. The reason for this shift is the resettlement of affected residents, the residential structures in the area have been completely replaced with or modified into commercial buildings as a result of increased confidence of the business community. On the other hand, the 19 barangays classified as rural (CLUP 1997-2010) showed an increase in population by much as 262%, 201%, 142% in Barangay Pagatpatan, Villa Kananga and Mahay, respectively which are resettlement areas of project-affected families.

Unintended Impact. Before LADP, the west bank barangays in the proximity of the concrete floodwall or dike was once the *poblacion*, where a blend of commercial, entertainment (movie houses, restaurants, bars, etc), public services, and mostly residential houses exists in the area where people congregate until late into the night. Today, 30 years after the start of construction of the LADP FCC, about 89% of the residents have left the area which has now turned into a central business district with heavy vehicular and human traffic during business hours and almost totally deserted in the evening.

Unplanned Benefits. The levees have become part of the city's road network. The east bank levee, which was initially designed with a crown of only 6 meters, but upon the intervention of the LGU and which DPWH acceded favorably, it was widened by 1.5 meters on each side having a final crown width of 9 meters. On the west bank, the levee's crown remained at 6 meters. Although a bit constricted, it is used as an important access road.

For the people who continue to stay inside the floodway, the levees have become a refuge, particularly women and children, by using the levee as immediate evacuation site during floods while men stay behind or near their houses to guard against looters.

People and Structures in the Floodway. Despite the prohibitions imposed by the project against building new structures along the floodway, 2018 data from the Agusan del Norte Electric Cooperative shows there are 5,656 households officially connected with electricity, 5,429 of which are residential, 144 commercial, 41 industrial, and 42 classified as others. As adaptation, ANECO installed lateral lines to these floodway subscribers wherein ANECO can switch off said electrical lines to isolate the area during floods to avoid electrocutions while keeping a large part of the city's power supply uninterrupted. Based on ANECO's data, it is estimated that the population within the floodway is 24,131 (4.17 HH size) and growing based on new structures seen in the conduct of the HH survey. During project implementation, according to LADP PMO, the floodway has a population of around 5,000. The LGU clearly did not enforce the No-Build Zone. The people in the floodway has remained a major concern of the LGU during floods through rescue, forced evacuations, relief operations and social support (CDRRMO).

Resettlement Sites and Settlers. Resettlement of affected families profoundly affected the start of FC-II project packages as the City Government required the Overall Resettlement Areas (ORA) from DPWH in response to pressures from the community due to a lack of a strategy addressing the issue during FC-I

The project thereafter purchased 72 lots in 11 barangays (total area 1,436,452 square meters) for the relocation and resettlement needs of families residing within the floodway denominated as Overall Resettlement Area (ORA). The sites were turned-over to the LGU by DPWH through a Deed of Transfer in 2011. The City developed 3,674 lots, awarded 2,606 lots, while 1,068 remains unawarded or vacant as of 2018.

Project Turn-over and Maintenance. The project was turned-over to Butuan LGU by DPWH in 2007. A MOA, later amended, defined the operation and maintenance responsibilities of the LGU. However in 2014, per advice of the OECF and GOP, the O & M responsibilities were entrusted to DPWH District Office in Butuan City after the LGU was found remiss in its obligations in the MOA.

Since the project turn-over, one flooding incident in 2014 put the FCS to the test through Tropical Depression Agaton where the flood level nearly breached the floodwall in the west bank leaving only 1.5 meters freeboard, while on the east bank, a section of the earth embankment levee at Brgy. Mahay eroded but was quickly fixed by DPWH LAPD PMO to prevent further deterioration.

Project Gaps. The standard width of the LAPD levee crown design is 9 meters. On the east bank, at the end section at Brgy. Maug, the crown tapered off to 6 meters, 1.64 kms long. Another gap on the east bank is the cut-off channel that was found to be short by 1.5 km. It failed to reach a critical land area at Brgy. Mahay where two creeks that used to drain off into Agusan River now passes through flood gates under the levee. During floods, the floodgates are shut to keep floodwaters of the Agusan River from affecting the protected area, this in turn traps the runoff water in the protected area from draining out, thereby inundating the ricefields and other areas in Mahay and Tagabaca.

On the west side, barangays in the proximity of the floodwall at the old downtown (Agao, Silongan, Urduja, Sikatuna, Humabon, Leon Kilat) suffer flooding during moderate to heavy rains. The flooding is caused by rainwater and run-off water that cannot drain into the LADP urban drainage system. It was found that the surface drainage in these areas are situated in a much lower elevation than the LADP drainage system. As remedy, LADP PMO installed (in 2019) two high capacity water pumps 1 km apart to suction off the floodwater from the streets and convey it into the Agusan River.

No protection measures were installed over the urban drainage floodgates. Vandals and thieves have stolen the sluices (flood gates, lifting mechanisms and frames) which were sold as scrap metal. Some parts were recovered by DPWH PMO with police assistance.

The west bank levee did not reach the coastline at Lumbocan. This gap has caused floodwaters from Agusan River to flow back into the protected area through Agusan Pequeño River where a floodgate should have been installed.

Implementation Issues. According to DPWH PMO, the issue on the Right-of-Way is the major obstacle in the implementation of the project. ROW-related issues caused the redesigning of the structures and work stoppages. This entailed additional works and increase project costs notwithstanding a delay due to litigation proceedings with a contractor and changes in foreign exchange rates. LADP was implemented with an increased cost higher by 99%, and completion time longer by 187%.

CONCLUSION

The LADP has fulfilled its envisaged goals by preventing floodwater from the Agusan River in inundating Butuan City and the development potential of the region, with Butuan City as the regional center, has increased and continues to progress since the project was implemented. It is safe to conclude that the LADP Flood Control Component has substantially accomplished its desired impact.

I. INTRODUCTION

The National Economic Development Authority (NEDA) - Regional Office Caraga engaged the services of the Foundation for Rural Enterprise and Ecology Development of Mindanao (FREEDOM), Inc. to undertake this study titled “Impact Assessment of the Lower Agusan Development Project (LADP) Flood Control Component” funded under the Monitoring and Evaluation Fund of NEDA Central Office.

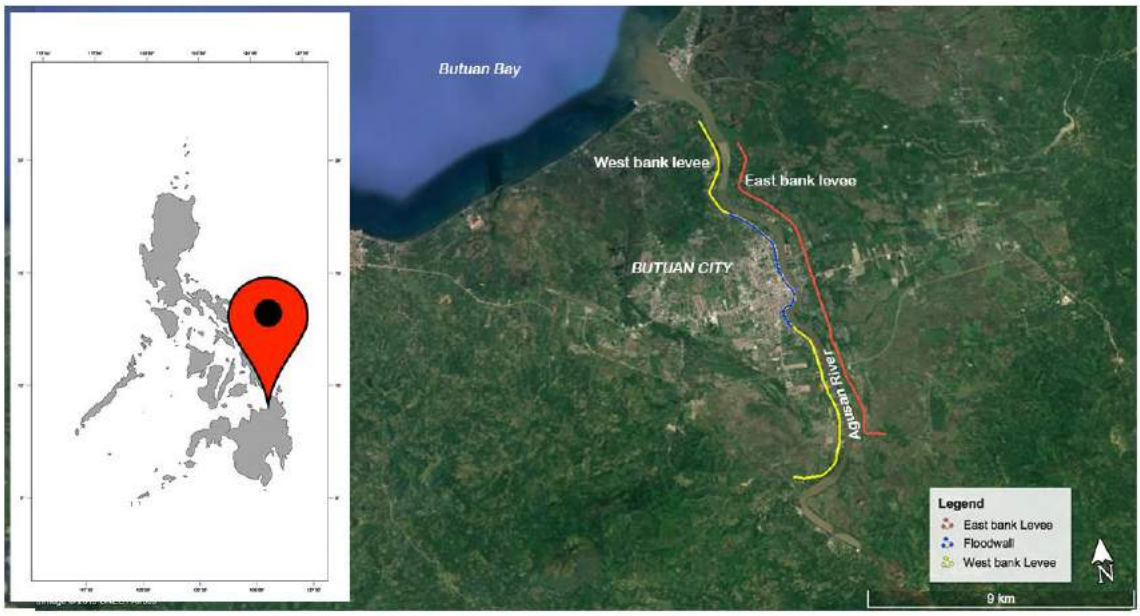


***Figure 1**. Location of the project.*

Purpose Of The Impact Assessment

The conduct of evaluation and assessment studies is one of NEDA’s mandates being the country's independent economic development and planning agency. NEDA Regional Office-13 initiated this study over an infrastructure project implemented by the Department of Public Works and Highways (DPWH) in Butuan City, see Figure 1. The LADP-FCC was implemented through the construction of flood control structures like floodwall or dike, levees and the improvement of the urban drainage system in order to prevent seasonal floods from disrupting the development and economic activities in Butuan City and surrounding areas.

This study is considered a priority concern since there are urban areas in other parts of the country that were once flood-free or had only experienced minimum flooding but are presently affected by floodwaters similar to the past experiences of Butuan City, which was once known as a city frequented by floods in as far back as 1923, affecting approximately 150 km^2 total area on both sides of the Agusan River.

The output of this study will enable the national government to come up with evidence-based decisions on the design and implementation of similar flood control projects in other parts of the country in the future.

Background of the Flood Control Project

The Agusan River is approximately 390 kilometers in length making it the longest river in Mindanao with headwaters starting in the Compostela Valley. Running from south to north it empties into the Butuan Bay at its mouth in Butuan City. Its basin covers an area of 11,400 km^2 at peak yields with bank-full capacity of the river of only 2,000 m^3 per second. This part of Mindanao is blessed with abundant rainfall throughout the year, during monsoon and typhoons the tributaries feeding the Agusan River aggravates the situation affecting a large swath of low lying riverside lands from Agusan del Sur that locals call "Upper Agusan" [1] towards Lower Agusan where Butuan City sits and suffer immersed in floodwaters. Key informants provided photos with passed-on accounts of flood events as early as 1923 persisting for 47 days, from 1961 through 1962. Another flood event according to sources occurred in 1963 that lasted 55 days.

Figure 2 is one of the oldest documentation of the flood in 1923 that affected the poblacion with about a meter high of floodwater from the Agusan River. People used dugout bancas (locally called "baroto") as mode of transportation in the city streets. The photo was taken in a residential-business area. The St. Joseph Church belfry can be seen in the background in front of it is the Plaza.

The situation depicted above clearly shows disruption of the day-to-day life of the people in Butuan City. Schools, offices and stores are shut effectively disturbing the economy and the over-all welfare of the people.

***Figure 2**. One of the oldest flood photos dated 1923.*

A photo of the same flood event in Figure 3 taken about two city blocks away from the photo in Figure 2 shows residents on board dug-out bancas in a residential-business neighborhood. The structure on the left of the photo is what "Life Bakery" looked like back then. It is still located on the same area in present-day M. Calo St.

[1] In the Agusan River Basin Master Plan of DENR 2016, p2-1 Upper Agusan River Basin, is described as the area along the upstream reach from Barangay Araibo, Pantukan, Compostela Valley to Sta. Josefa in Agusan del Sur.

Figure 3. *The mode of transportation shifted to baroto (dug-out banca) during the 1923 flood.*

Other flooding episode documented through photograph was during the 1961 to 1962 flood as a result of continuous rains during the monsoon season from November to December. The Agusan River is behind the structures in the background of the photo.

Figure 4. *Scene at G. Flores Ave. during the flood in December 1961 up to early February 1962.*

A horse-drawn cart or calesa (“tartanilla” in Cebuano) plods its way in a flooded street in Butuan City as shown in Figure 5. The calesa was used as mode of public transport in the 1960s.

Figure 5. *Photo taken during the January 28, 1961 to March 11, 1962 flood.*

A school building in Figure 6 is surrounded by floodwaters. It may be built on stilts that prevented the floor from being submerged, however the classes were still suspended if it can be accessed using small boats.

Figure 6*. A 1962 photo of a school building surrounded by floodwaters.*

Figure 7. *This 1963 flood photo shows shin-deep flood along R. Calo St.*

The series of flooding prompted the Butuan City government to start building flood control structures called Concrete Rubble Walls in 1975 at the west bank by using its own meager resources. Made of concrete, it was built low in height and did not provide much protection at only 3 kilometers along the downtown of the growing city, see Figure 8. Efforts were also made to drain a large portion of the city, then a wetland covering 50 km^2, through dredging of creeks and digging a network of drainage canals that empty towards Masao River and Agusan Pequeño River, two of the important rivers in the city west of Agusan River.

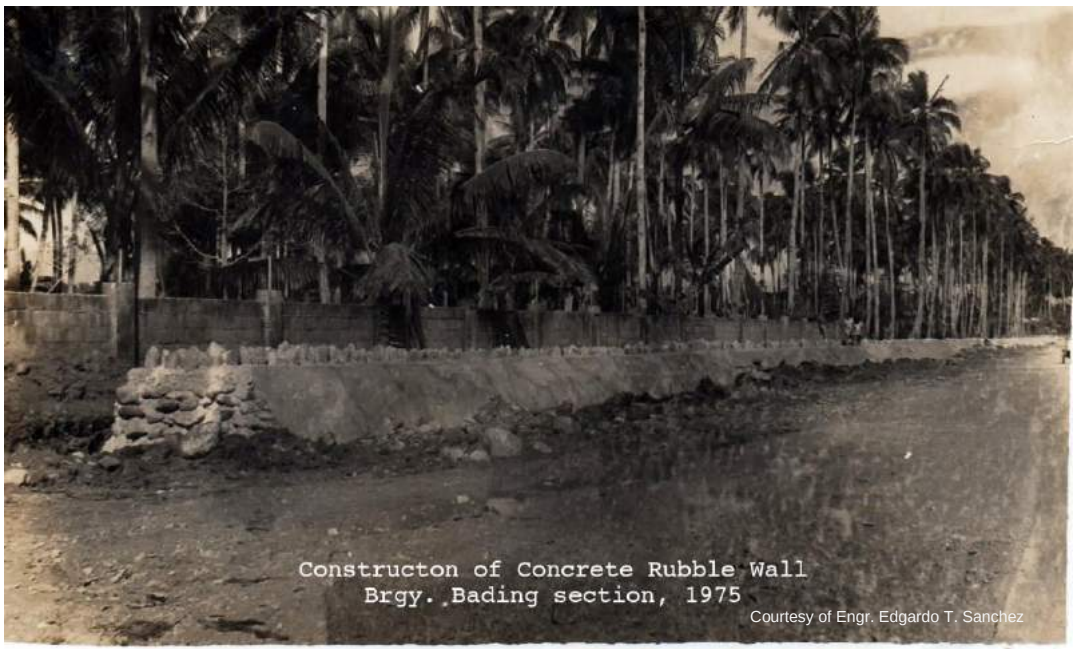


Figure 8*. Concrete Rubble Wall, an early attempt at protecting the city from floods due to river overflows.*

Figure 9 is a photo of G. Flores Avenue where a section of the locally financed low-rise dike can be seen on the right portion. The Post Office, still existing today, is seen at the background.

Figure 9. *A photo believed to be taken between 1975 and 1976 at G. Flores Ave.*

In June 1978 the Cotabato-Agusan River Basin Development Project (CARBDP) was established under DPWH through a Presidential Decree to develop the basin of Cotabato River and Agusan River.

The Philippine Development Plan of 1987 gave importance on the construction of flood control structures to prevent damage and losses in flood-prone areas in the country.

In 1988 the Cotabato-Agusan River Basin Development Project – Lower Agusan Development Project was launched as one of the flagship infrastructure projects of the government aimed at providing better irrigation systems for water supply needs of the huge and fertile Agusan Valley, and flood control.

The CARBDP - Lower Agusan Development Project (LADP) implemented in Butuan City has two major components, Flood Control and Irrigation. The Flood Control Component aims to mitigate flood damage through the construction of an earth levee or embankment along the banks of the river, dredging works and improvement of urban drainage systems in the city, while the Irrigation Component aims to increase rice production of a portion of the agricultural lands in Butuan City through the construction of irrigation facilities utilizing the water from Agusan River.[2]

Legal Basis of the LADP – FCC Project

- Presidential Decree no.1556 issued on June 11, 1978 entitled “Implementing the Cotabato – Agusan River Basin Development Program Creating for the Purpose the Cotabato – Agusan River Basin Program Office and Providing Funds Therefor.”

- Medium – Term Philippine Development Plans (MTPDP) 1987 – 1992 and 1993 – 1998) flood mitigation through Flood Control structures was identified as one of the priority programs. The GOP prioritized the

2https://beta.philstar.com/nation/2005/08/03/289601/butuan-flood-control-project-one-dpwhs-best#3T28ZRaZQxDIyWGQ.99

implementation of flood control and drainage projects along the 12 major rivers in the country, including the Lower Agusan River Basin.

The two legal bases spanned the Martial Law and post martial law era. Feasibility Study (1981) and Detailed Design (1983) were done during the former and Phase I was implemented during the latter, in 1988 onward.

Figure 10 shows the progression of the flood protection efforts, from the one built by the local government in 1975, and the LADP floodwall built beside it in 1993.

Figure 10. *The FC-I floodwall on the west bank built beside the old concrete rubble wall.*

The DPWH LADP-PMO presented a location map of the LADP, Figure 11, that aided the evaluation in defining the scope and coverage of the flood control project, in locating the different project sites of the two phases of project implementation and other information relevant to the impact assessment.

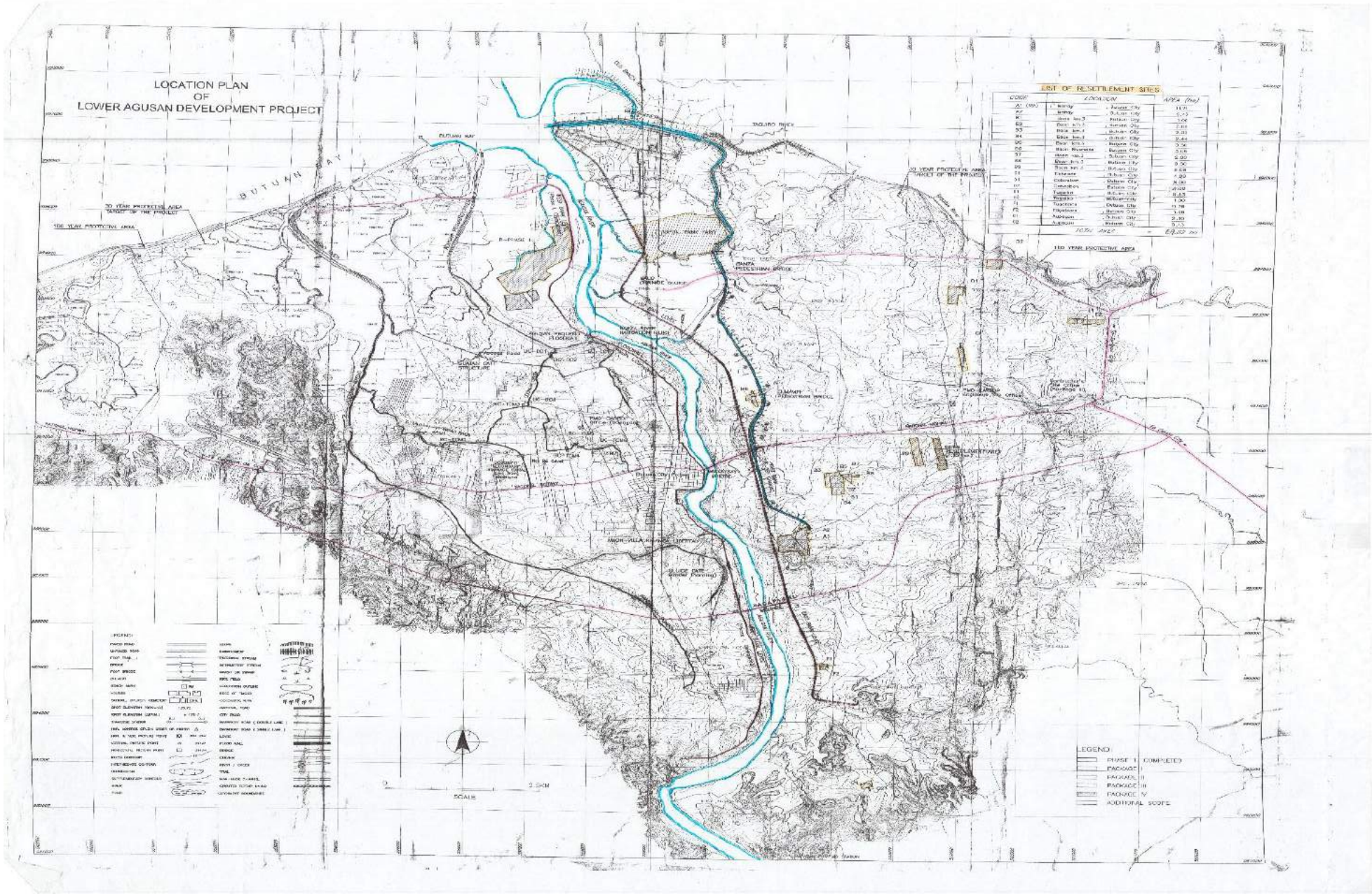


Figure 11. *DPWH Location Plan of the LADP*

Climate and Rainfall in the Area

The mean annual rainfall of the Philippines varies from 965 to 4,064 millimeters annually. Baguio City, eastern Samar, and eastern Surigao receive the greatest amount of rainfall while the southern portion of Cotabato receives the least amount of rain. In General Santos City and Cotabato City, the average annual rainfall is only 978 millimeters.[3]

Caraga Region is split into two climate types according to the modified Coronas classification. Type II, which is characterized as no dry season with a very pronounced maximum rain period is experienced in Surigao del Norte and Surigao del Sur and the entire eastern seaboard, and Type IV which is the climate in Agusan del Norte and Agusan del Sur including Butuan City is where rainfall is more or less evenly distributed throughout the year, much like Type II, which has no dry season. Type IV climate extend over the Davao regions and Compostela Valley where the source of water of the Agusan River begins some 390 kilometers from Butuan City.

The 1981 DPWH Feasibility Study Report presented a hydrologic study establishing the flow discharges and frequency of occurrences for Agusan River measured at the entrance of what was then the proposed floodway located at Brgy. Amparo as the northern limit of the project area is shown in Table 1.

Table 1. Computed flood discharges of Agusan River

Volume of Water, m^3/sec	Return Period, frequency
2,300 cumecs	2-year
4,000 cumecs	5-year
5,200 cumecs	10-year
6,100 cumecs	20-year
7,200 cumecs	50-year
8,000 cumecs	100-year

The situation of Butuan City and its immediate environs, based on the discharges, becomes aggravated by the outfall of the tributary rivers and creeks within the area. The estimated affected areas and the land classification is shown in Table 2, below.

Table 2. Rain Return Period and Affected Areas in Butuan City

Return Period (Year)	Flooded Area (Hectares)			Total (Hectares)
	Commercial	Marsh	Agricultural	
10	1,735	4,272	10,232	16,239
20	1,745	4,272	10,576	16,593
30	1,767	4,272	10,746	16,829
50	1,811	4,272	11,086	17,169
100	1,855	4,272	11,474	17,601

Source: Project TOR Data

A simulation map produced by Geo-SAFER Mindanao-Agusan Project, used a numerical model to simulate the flood extent and hazard levels that may be experienced if the rain falling in the watersheds upstream the river basin reaches 284.83 mm or 11.2 inches within 24 hours. Although this scenario has a 2% probability of occurring in any given year, floodwater level is expected to be over 1.5 meters in the low sections of Butuan City, see Figure 12.

[3] http://bagong.pagasa.dost.gov.ph/information/climate-philippines

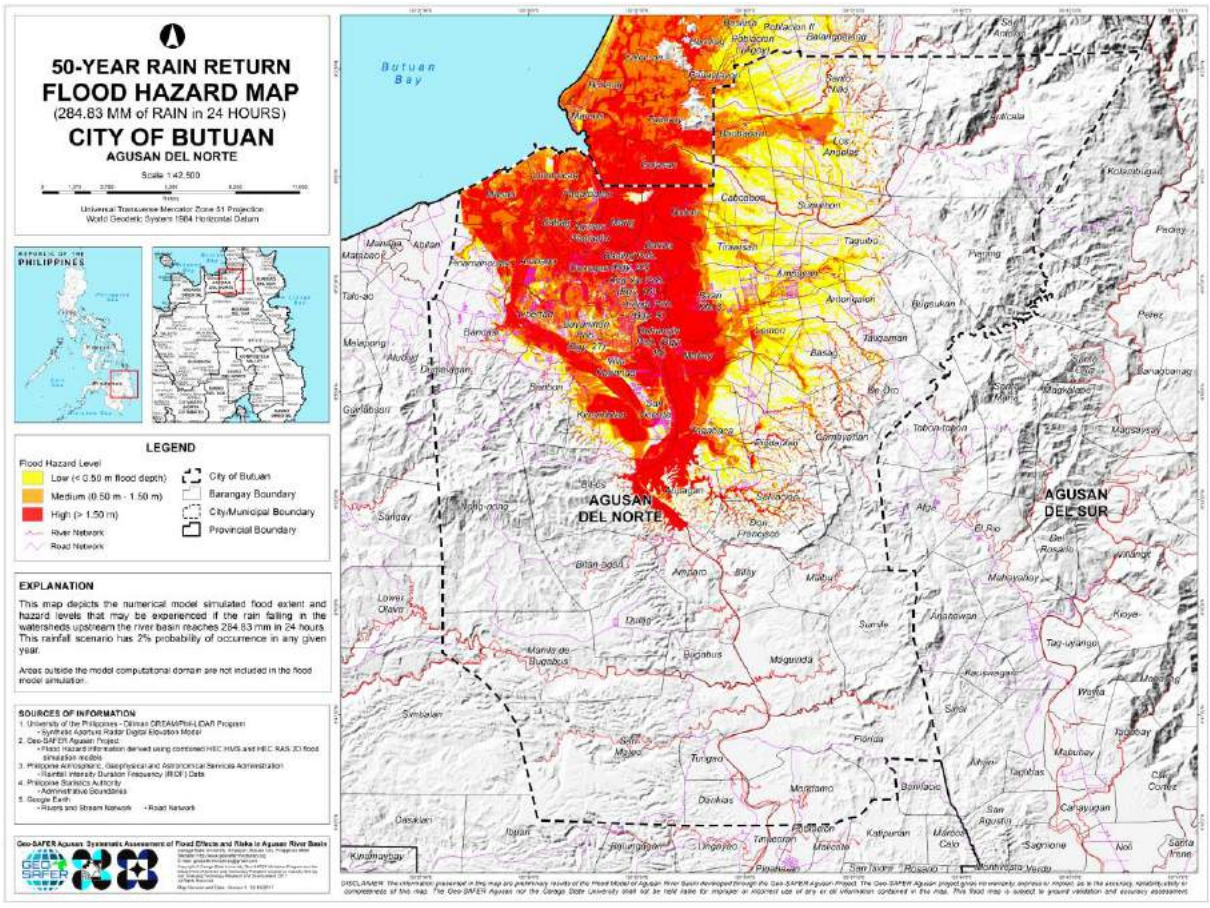


Figure 12. *Simulation map showing 50-year rain-return scenario.*

Data from the PAGASA in Table 3 shows that from 2010 to 2016 the rainfall in the area do not strictly follow a pattern throughout the year as it differ in the number of rainy days per month including the degree of rain volume. The highest recorded was on January 2014 during Tropical Depression Agaton with a total rainfall volume of 721.4 mm, and the lowest amount of rainfall occurred on March 2016 with only 3.6 mm recorded.

Table 3. Rainfall Data and Number of Rainy Days, Butuan City, 2010-2016

MONTH	Rainfall (in millimeters)							No. Of Days						
	2010	2011	2012	2013	2014	2015	2016	2010	2011	2012	2013	2014	2015	2016
1. January	501.1	745.9	273.6	511.4	721.4	331.5	21.0	21	24	24	27	27	20	14
2. February	69.2	512.8	331.4	275.6	72.7	63.3	80.5	13	18	23	22	12	9	13
3. March	122.8	336.9	114.3	179.1	258.8	40.6	3.6	10	10	21	20	20	12	4
4. April	122.8	70.9	204.8	111.4	57.4	25.9	30.6	13	2	17	11	13	7	9
5. May	120.5	167.0	92.8	100.1	100.8	69.8	136	16	5	13	15	21	5	17
6. June	66.4	255.6	155.4	287.7	145.7	172	320	16	6	16	18	13	22	20
7. July	124	192.2	197.6	105.3	149.2	130.2	242.3	18	6	22	20	17	14	17
8. August	197.9	132.5	69.7	200.5	131.4	59.3	54.3	19	4	9	17	15	15	11
9. September	49.3	93.2	162.5	19.5	225.8	141	230.4	14	3	17	7	15	11	18
10. October	136.3	271.3	146.4	137.9	82.7	124.6	209.6	15	8	18	11	15	16	22
11. November	110.6	157.2	291.1	232.2	167.5	294.7	304.0	17	5	23	23	16	24	22
12. December	143.2	343.9	170.8	130.3	416.2	242.2	152.4	18	11	20	21	24	22	20

Source: PAGASA 2017

Courtesy of Geo-SAFER Mindanao

II. The LADP Theory Of Change

The Theory of Change is used generally to refer to any process of intervebtion, including a results chain, "which shows a series of boxes from inputs to outputs, outcomes and impacts or a logframe, which represents the same information in a matrix"[4]. The present DPWH PMO has no record of the project's logical framework which would have been a key document in laying out the elements and stages of the Theory of Change (ToC). NEDA Caraga provided a 1983 Design Report of the Lower Agusan Development Project of the Ministry of Public Works and Highways where it stated the Objective of the Flood Control, to wit, "the Lower Agusan Development Project aims to increase the development potential of the region by protecting Butuan City and its surrounding areas from flooding and by introducing more intensive agricultural production through irrigation."

In lieu of the log frame, the Objective of the Flood Control project becomes the basis of the LADP Theory of Change. The outcomes underlying the LADP Flood Control design are as follows:

1. That Butuan City will be free from frequent flooding after the flood control structures and component projects are built.
2. That the poverty incidence will decrease and living conditions improve.
3. That there will be increased confidence of businessmen to invest and existing businesses will expand as economic activities continue without disruption due to floods.
4. That the waters from the basin will flow within the floodway into Butuan Bay.
5. That on the east bank, local rainfall will be drained by the 6 km. Cut-off Channel into the improved Banza River and finally into Butuan Bay.
6. That on the west bank, the downtown area, the local rainfall will drain through the improved Urban Drainage System and finally into Butuan Bay via the improved Masao River and Agusan Pequeño River.

It is assumed that all residents who were directly affected by the infrastructures will be relocated and permanently reside in the project-acquired resettlement sites. Further, that the floodway will be free from obstructions to allow the flow of floodwater unimpeded into Butuan Bay.

The impact of the flood control project will be an increase in the development potential of the region. This can be measured in terms of changes in socio-economic condition of the people of Butuan City and the region through an increase in overall population, the changes in land use, a shift of existing settlement patterns, and development of all industry sectors.

An improvement of living standard of the people were measured through related indicators such as increase in income, increase in assets, reduction of poverty incidence, increase in school participation rate, improvement of health, reduction of losses due to flooding, generation of employment, sustained business operations, and participation of men, women, elderly and children among others.

Figure 13 shows the project's theory of change starting at the stage of finding a solution to the frequent flooding endured by the city and its people. The flood control structures were built as an output to contain the high volume of water of Agusan River during flood season. It is a floodway that is 15 kms long and 800 meters wide, designed to handle 8,000 cubic meters per second of water based on the highest flood level in 1962. Another output is the improvement of the urban drainage system in the downtown area designed to re-direct the flow of rain water collecting in the area which would have flowed towards the Agusan River but will now be blocked by the floodwall. The re-directed city run-off water will pass through drainage canals, through the improved Masao River, Agusan Pequeño river and creeks, and into Butuan Bay.

Another output of the project is the acquisition of relocation or resettlement sites for residents who will be displaced by the construction of the floodwall and levees, and to free the floodway from structures.

Policies will be enacted over aspects of the project output like sustainability mechanisms i.e. operations and maintenance, public access, and improvements.

[4] Rogers, P. Theory of Change, *Methodological Briefs: Impact Evaluation 2,* page 1

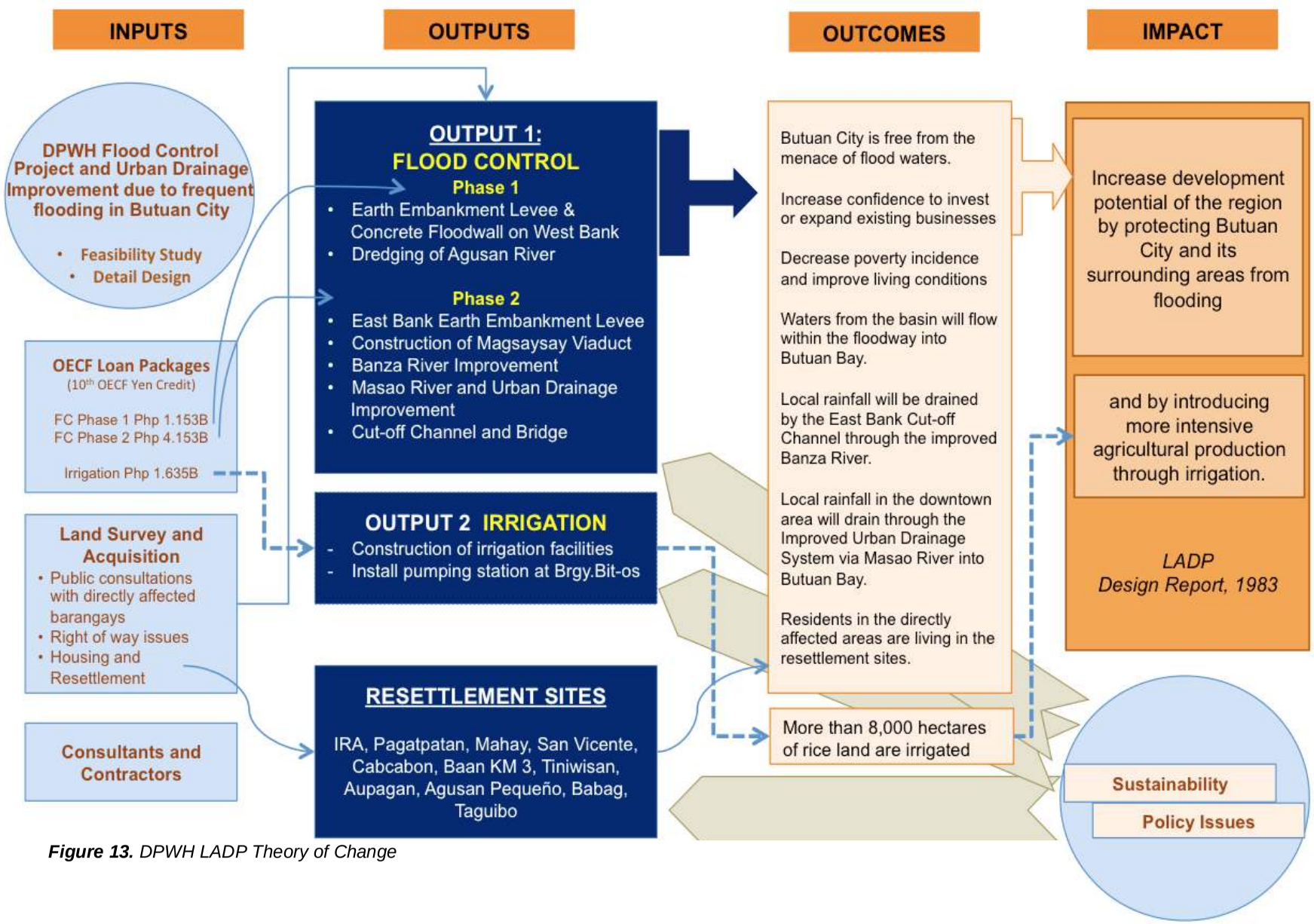


Figure 13. *DPWH LADP Theory of Change*

ToC Project Inputs

In 1981, the LADP Feasibility Study Report was completed by Technosphere Consultants Group, Inc. and Nippon Koei Co., Inc. The study presented two design schemes. The Consultants endorsed Scheme B which features the implementation of the 800-meter wide natural Agusan River floodway that can carry a 100-year rain-cycle at 8,000 cumecs (cubic meters per second) of floodwater through the construction of confining dikes/levees on both sides of Agusan River. Scheme A, on the other hand, included the construction of a 15 km long and 300-meter wide cut-off channel starting at Barangay Bit-os towards Butuan Bay designed to divert 3,000 cubic meters of water from the 8,000 cubic meters (100-year rain-cycle flooding event) thus reducing the volume of water through the 800-meter floodway.

In October 1983, the Ministry of Public Works (MPWH) released a 4-volume LADP Design Report. The Flood Control Project was contained in Volume I, which mentioned the flood that occurred in December 1980 through February 1981 as an event that highlighted the urgent need to build flood control measures with irrigation facilities.

To mitigate the impact of flooding episodes in Butuan City, DPWH theorized that the Lower Agusan Development Project (LADP), when implemented, would spur economic development when it is no longer interrupted or disrupted by flood.[5] The Government of the Philippines tapped the Overseas Economic cooperation Fund (OECF) of Japan to finance the project. The LADP Flood Control Component has two loan phases, namely Flood Control Phase 1 (FC-I at Php 1.153B) and Flood Control Phase 2 (FC-II at Php 4.153B). FC-I was implemented from January 1988 to December 2000, while FC-II was undertaken on March 1997 until February 26, 2007[6]. The Irrigation Component was at Php 1.635B.

Main consultants for the projects were Nippon Koei, Co. Ltd (Japan) for FC-I and PKII Engineers (Philippines), TCBI Engineers (Philippines), and Nippon Koei, Co. Ltd (Japan) for FC-II.

The estimated investment cost and actual disbursement for the project is presented in Table 4.

***Table 4**. Project Cost and Actual Disbursements*

Project Components	Approved Amount	Disbursed Amount
Flood Control I (FC-I)	3,372 million yen	2,798 million yen
Flood Control I (FC-II)	7,979 million yen	7,317 million yen
Irrigation	4,040 million yen	3,899 million yen
TOTAL	15,391 million yen	14,014 million yen
In PhP Equivalent*	**Php 6,231.7 M**	**Php 5,673.68 B**

Source: JICA Evaluation Study, Haruko Awano, IC Net Limited, 2010
**2007 Exchange Rate: Php1=Y2.47*

[5] Relevant Country/Sector Context, Terms of Reference, Impact Assessment of the Lower Agusan Development Project (Flood Control Component), NEDA
[6] Ex-Post Evaluation, 2010, p.2

ToC Project Outputs

The Flood Control (FC) project was implemented in two phases: FC Phase 1 was from 1988 to 2000, FC Phase 2 from 1997 to 2007 with a total amount of P5.553 billion funded through a concessional loan provided by then Bank of Japan of International Cooperation (JBIC), now the Japan International Cooperation Agency (JICA) under the Overseas Economic Cooperation Fund (OECF).

FC Phase 1 was implemented in the west bank with the following outputs:

- Embankment Levee
- Concrete Floodwall
- Dredging of the Agusan River
- Improvement of Urban Drainage System
- Floodgate
- Spoil Bunk Yard

FC Phase 2 consisted of four contract packages with the following distinct outputs:

- Package 1 – Improvements on the East Bank
    - Embankment Levee
    - Maintenance Road
    - Spillway, Irrigation Canal Crossing, Drainage sluice and siphon
    - Cut-off Channel (Mahay to Maug)
    - Tumampi Bridge for Pedestrians
    - Concrete Dike
    - Dredging of the Agusan River

- Package 2 – Construction Viaduct and Bridge
    - Construction of Magsaysay Viaduct
    - Construction of Cut-off Channel Bridge
    - Construction of Approach Road

- Package 3 – Banza River Improvement
    - Dredging of Banza River
    - Spoil Bank Yard
    - Land Improvement
    - Concrete Floodwall
    - Banza Pedestrian Bridge

- Package 4 – Masao River and Urban Drainage Improvement
    - Masao River Improvement (11.7 km Levee)
    - Masao River Dredging
    - Improvement of 6 urban creeks, 30 km total length
    - Drainage Channels with sluices and culverts

ToC Project Outcomes

DPWH theorized that with the flood control structures in place including the improved urban drainage system, floodwaters would no longer enter the city. Instead, rainwater that has collected and amassed in volume coming from the upper stream of Agusan River will follow the floodway as designed which will keep all the water within the confines of the levees and floodwall and guide the water towards the mouth of the river and into Butuan Bay which is about 14 kms. from where structure of the levees began.

In anticipation of the volume of rainwater collecting in the east bank, a 6-kilometer cut-off channel drains the water that brings it to the improved Banza River. In the west bank, the local rainfall gathering in the downtown area will drain through the network of canals that are part of the improved urban drainage system that will carry the water into Butuan Bay via the improved Masao River and Agusan Pequeño River.

Another project outcome is the resettlement of families whose lots and houses were directly in the project's path, including residents who will be in the danger zone arising from construction of the floodwall/levee and the river, which will eventually become a floodway. DPWH planned to acquire parcels of lots in different barangays to serve as resettlement sites for all directly affected residents.

DPWH will turn-over the project to the LGU of Butuan after completion for Maintenance and Operations, and for the LGU to put in place sustainability mechanisms to extend the lifespan of the structures. Butuan City will enact policies towards the protection of the whole project and implement rules and regulations on public access, improvement, expansion and keep the environmental impact at a minimum.

ToC Project Impact

The impact of the project is herein contained in this Final Technical Report on the determination of the effectiveness of the flood control structures and improvement of the urban drainage in increasing the development potential of the region by protecting Butuan City from flooding.

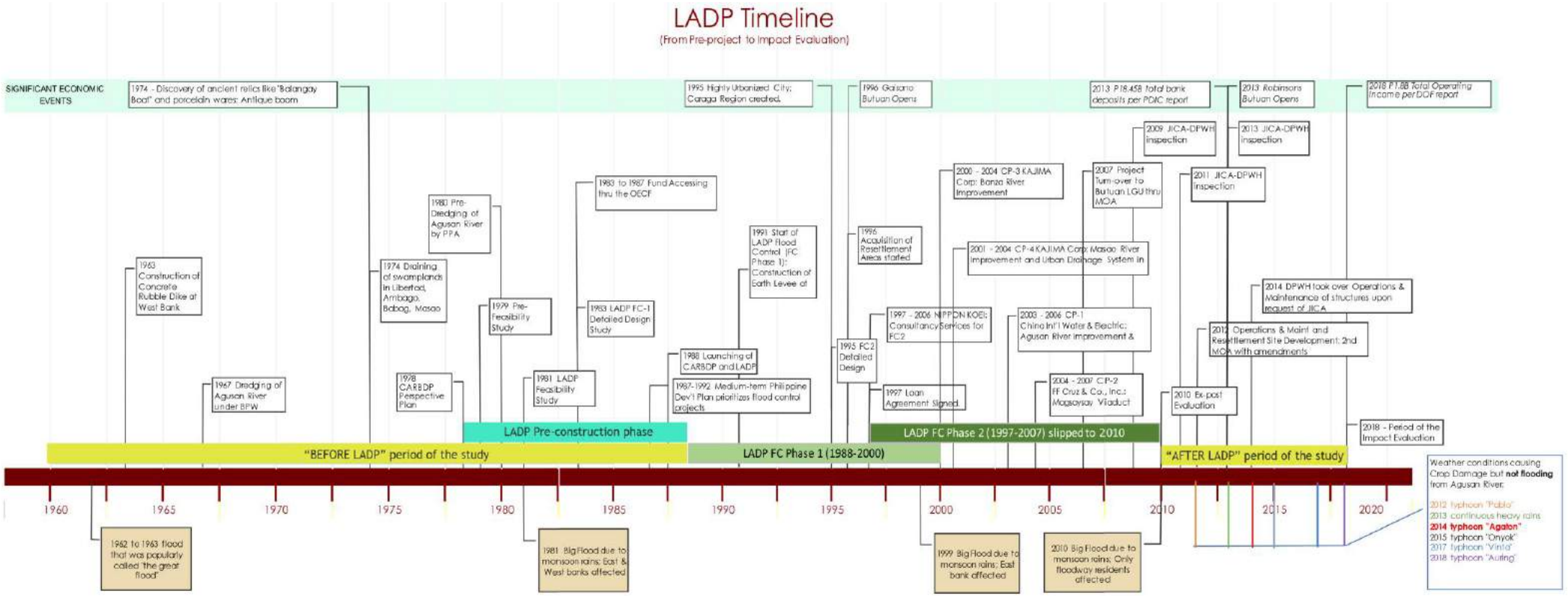


***Figure 14**. Timeline showing LADP Phases and other events*

III. METHODOLOGY

Evaluation of the overall socioeconomic impact of LADP FCC involves the standard identification of the problem: one does not know how beneficiaries in particular and the economy of Butuan City in general and environs would have behaved had the flood control intervention had not been implemented at all. To construct a reasonable counterfactual case, we rely on comparisons across time between the community at Brgy. Hawilian, Esperanza, Agusan del Sur as comparison group. A municipality which is similarly situated as Brgy. Mahay in Butuan City being located by the banks of the Agusan River. It is about 30 kms. upstream from the city. The flooding episodes for both communities were similar in timeframe. There has been no flood control project in Esperanza.

The counterfactual study uses difference-in-differences statistical tools. The difference-in-differences deals on the assumed common trends in results between treatment and comparison groups invoked in the study. The full report of the counterfactual is presented in Page 31.

EVALUATION QUESTIONS

The conduct of the impact assessment was guided by the evaluation questions as shown in Table 5 which were based on the Scope of Work of the study.

Table 5. Evaluation Questions

	Questions
Relevance	Are the LADP Objectives still relevant? • Have the Flood Control Structures met the needs of Butuan City? • Are the Flood Control Structures in line with the LGUs priorities?
Efficiency	Did the project Inputs efficiently contribute to the attainment of the Outputs? • Were the Inputs fully utilized? • Were the Inputs allocated delivered the appropriate Outputs in a timely manner? • Were the quantity and quality of the Outputs appropriate?
Effectiveness	Did the LADP – Flood Control Components achieve the expected effect? • Were the targeted results or the Outcomes achieved as planned? • To what extent did the FCS contribute to the achievement of the desired change?
Impact	Did the LADP – FCC produce positive/negative impact or direct/indirect impact? • To what extent was the overall Goal achieved? • To what extent did the project contribute to the achievement of the overall Goal? • Were there any other unexpected positive or negative impacts?
Sustainability	Can LADP-FCC, its effects and structures, be sustained by the LGU? • Are the Outcomes likely to continue? • What are the contributing/ inhibiting factors to sustain the Outcomes?
Policy Issues	What are the policy considerations for future implementation of a similar project in other parts of the country? • What institutions or government agencies affected by policy issues? • What kind of institutional arrangements necessary to avoid similar issues?

DATA COLLECTION METHODS AND TOOLS

In establishing the foundation for the study, the researchers utilized generally accepted methods of data gathering. Table 6 shows the tools used in the impact evaluation.

Table 6. Data Collection Methods and Tools

Data Collection Methods	Tools
1. Collection of Secondary Data	Evaluation questions; TOR
2. Interview, face-to-face	Structured questionnaire
3. Key Informant Interviews	Semi-structured questionnaires
4. Focus Group Discussions	Semi-structured questionnaires
5. Online search	Specific issues, topics, data

The raw data collected were processed and analyzed to produce meaningful, relevant and evidenced-based output data. Figure 15 shows a sampe of the process in generating data output.

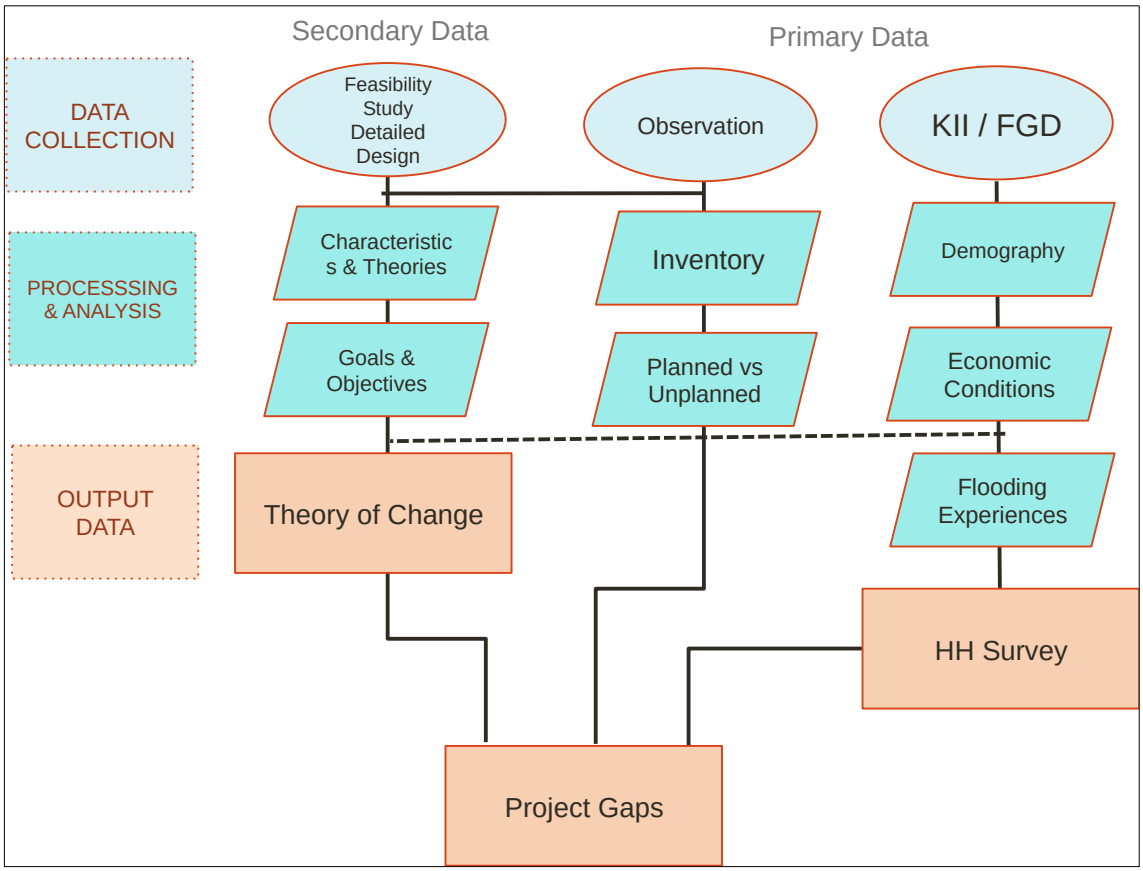


Figure 15. *Methodology for generating data output for the study. Shown is identifying project gaps.*

A. Data Mining and Comprehensive Review of Secondary Data

The researchers gathered secondary information from official government reports, project documents and related literature.

NEDA Caraga Regional Office sent out letters to the regional offices of NGAs and the LGU of Butuan introducing the impact study and endorsed the consulting firm to retrieve information and data regarding the flood control project and flood-related data. The researchers set out appointments for the data gathering visit.

Foremost is the DPWH LADP Project Management Office being the lead agency in the implementation of the flood control project. Obtained were the Project Location Plan, 1981 CARBDP LADP FCC Feasibility Study, 1983 Detailed Engineering Design for FC-I, 2010 JICA Ex-post Evaluation Report and other project memos and references.

Butuan City LGU facilitated in providing data pertinent to the study through various offices like the City Assessor's Office, City Housing and Development, City Agriculturist's Office, City Planning and Development Office, City Architect's Office, City Welfare and Development Office, City Health Office and the Sangguniang Panglunsod.

LADP project-related references formed part of the review such as the Caraga Regional Development Plan, the Comprehensive Land Use Plan (CLUP) and Comprehensive Development Plan (CDP) of Butuan City, and the Local Climate Change Action Plan of Butuan City among others.

A review of existing project documents was analyzed in the different stages of the project as presented in Figure 16.

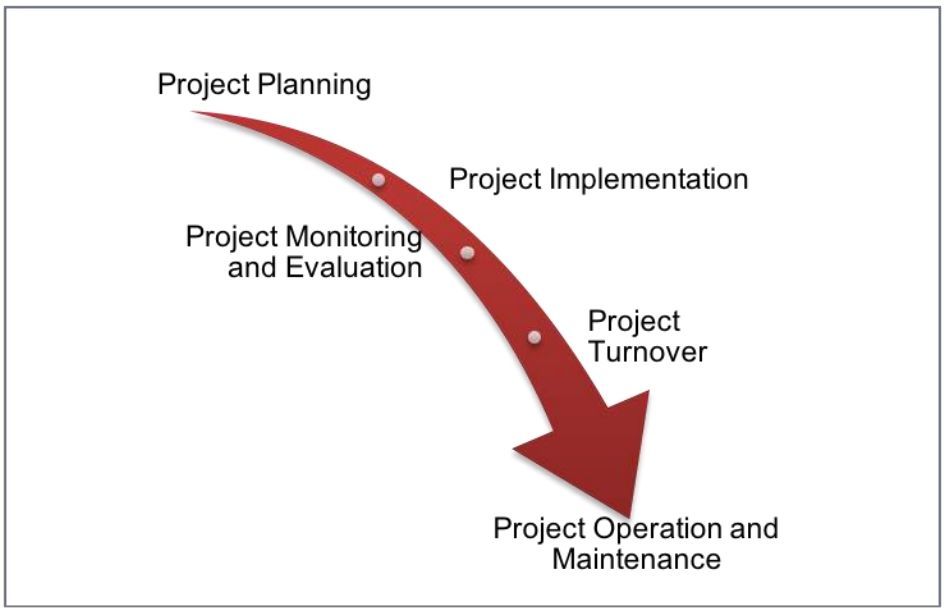


***Figure 16**. LADP Project Cycle*

B. Generating Primary Data

As far as data collection tools were concerned, the study involved the use of a semi-structured questionnaire, which was used as an interview guide for the field enumerators. Additional questions were made during the interviews for clarifications and for the satisfaction of research objectives.

The primary data for this study would come from household survey (HH), focus group discussions (FGDs), and key informant interviews (KIIs). The following are the detailed methodology and status of the generation of primary data.

Household Survey

The survey employed a multi-level random sampling method wherein the first level is the stratification across twenty-three (23) barangays on both banks of the Agusan River that were directly impacted by heavy flooding in 1962 and 1981 including minor flooding in between. The second level of stratification was done in reference to the floodway, those living within the floodway and those immediately outside the floodway.

The survey questionnaire was formulated with the guidance of consultant-statisticians from Southwestern University, which was based on the objectives of LADP. Pre-testing was conducted and the revisions were undertaken by consultant-statisticians from Caraga State University giving emphasis on content and face validity, and reliability of the instrument.

The survey proper was conducted by FREEDOM, Inc. regular enumerators buttressed with a special training and practicum on field survey, supervised by two trained coordinators.

a. Sample Size

Probability sampling was adopted. A sample size of 384 respondents was taken from 23 directly affected barangays with a population of 109,260 persons. Captured data were encoded using MS Excel and tested as to its normalcy and homogeneity before it was subjected for processing using SPSS. Descriptive analysis was generated from the findings of the survey. Sample size was obtained using the formula for estimating population proportion which is given by

$$\mathbf{n} = \frac{\mathbf{N}\left(\mathbf{z}_{\alpha/2}\right)^{\mathbf{2}}\mathbf{pq}}{(\mathbf{N}-\mathbf{1})\mathbf{ME}^{\mathbf{2}} + \left(\mathbf{z}_{\alpha/2}\right)^{\mathbf{2}}\mathbf{pq}}$$

where $\mathbf{n}$ is the sample size, N is the total household size, N= 109,260, $\mathbf{z}_{\alpha/2} = \mathbf{1.96}$ at 0.05 level of significance, $\mathbf{p} = \mathbf{q} = \mathbf{0.5}$, and the margin of error is $\mathbf{ME} = \mathbf{0.05}$. The Level of Confidence in targeting 384 respondents is at 95%.

Table 7 presents the distribution of respondents across the twenty-three (23) barangays in Butuan City directly impacted by the project. Of the 384 total respondents, 192 of them are those coming from within the floodway. The remaining half of them, were taken from outside the floodway.

***Table 7**. Distribution of respondents of the HH survey*

	Barangay	Population Size	Sample Size		
			Within the floodway	Outside the floodway	Total
1	Buhangin	4,407	8	8	16
2	Aupagan	1,660	16	0	16
3	Tagabaca	3.487	8	8	16
4	Mahay	4,062	8	8	16
5	Baan Km 3	11,308	0	18	18
6	Baan Riverside	5,376	18	0	18
7	Mahogany	5,218	9	9	18
8	Banza	4,325	0	16	16
9	Maug	2,778	8	8	16
10	Rajah Soliman	465	0	16	16
11	Bit-os	3,166	8	8	16
12	San Vicente	16,187	9	9	18
13	Pangabugan	2,630	8	8	16
14	Maon	5,072	9	9	18
15	Golden Ribbon	3,833	8	8	16
16	Agao	778	8	8	16
17	San Ignacio	2,637	8	8	16
18	Ong Yiu	4,859	8	8	16
19	Port Poyohon	4,798	8	8	16
20	Obrero	9,774	9	9	18
21	Agusan Pequeño	5,070	9	9	18
22	Pagatpatan	5,933	9	9	18
23	Bading	4,921	8	8	16
	Total	109,260	184	200	384

Equal sample size allocation per barangay was adopted to have equal representation of respondents within and outside the floodway. Thus, from the 384-sample size every barangay has sixteen (16) respondents. To complete the target number of respondents, additional respondents were added to top populous barangays such as Baan Km3, Baan Riverside, Mahogany, San Vicente, Maon, Obrero, Agusan Pequeño and Pagatpatan. Eighteen (18) respondents each from theses barangays were interviewed accordingly.

b. Sampling Procedures

The sampling procedure begins with the predetermination of the landmarks inside the target areas as Random Start (RS) spots which include the following: (i) Barangay Hall, (ii) School/Day Care, (iii) Chapel/Mosque, (iv) Basketball Court Industrial Site, (v) Health Center/Clinic/Hospital, (vi) Cemetery, (vii) Terminal, and (viii) other permanent landmark.

c. Research Instruments

There were two sets of questionnaires for the field interviews. Set A is the Socioeconomic Demographic questionnaire, and Set B is the Flood/Project Perceptions & Insights questionnaire. The questionnaires used is attached in Annex 1.

d. Interview Procedures

Gathering of primary data by Field Enumerators (FEs) through personal interviews using the guide questions (Set A and Set B) to the randomly selected respondents. Quality control measures during the interviews were done in such a way that the Team Leader will: (i) randomly supervised the interaction between the FE and respondent, and (ii) back-checking of two (2) respondents per cluster of the first 5 target areas.

e. Data Processing

Processing data involves four major steps, namely coding, data entry, table generation and theme formulation of significant statements. The coding process involves the designation of a number (1, 2, 3, etc.) to a specific answer to the questions. All coded information from the questionnaire are entered into as a data file. These are thoroughly reviewed to ensure that answers are logically consistent. Use of spreadsheet such as MS Excel was intended for data banking and analysis. Semantic Differential technique was employed to determine the dominant responses on 'problems encountered' in the survey.

Figure 17. *Data Processing Flow*

f. Data Analysis

Descriptive analysis was performed to obtain descriptive statistics, which defined the quantitative characteristics of the data gathered. Analytical processes on the survey data were done using MS Excel spreadsheets. Research consultants from two academic institutions were tapped to ensure the validity and reliability of the instruments, sampling process, data entry, and data analysis.

Focus Group Discussion and Key Informant Interviews

KIIs were conducted to individuals and officers who have a direct hand in the project implementation and those directly affected by the project. FGD was undertaken with persons in affected areas, resettled residents, residents who opted to stay within the floodway, women, youth and children. Directly affected barangays that were not included in the field survey due to the absence of residents within the floodway were subjected to FGD sessions. These barangays are Urduja, Sikatuna, Humabon, Leon Kilat and Datu Silongan.

a. Purpose

The purpose of the activity was to draw upon participants' attitudes, feelings, beliefs, experiences and reactions towards the flood control structures of the Lower Agusan Development Project, where data would not be possible using other data gathering methods, like one-to-one interviews,

questionnaire surveys, or observation. Specifically, results of FGD and KII validates/triangulates the output of the other data gathering methods used in this study.

b. Scope

The focus group discussions (FGD) were participated by selected residents of the 27 barangays where the dikes or levees have traversed. Also included were those relocated in five relocation sites in Butuan City who were directly impacted by the flood control structures and having first-hand flooding experiences. The FGD sessions were separately attended by participants coming from groups in the East Bank, West Bank and Relocation Sites. Each group consisted of 8-10 participants per session.

c. Selection of Participants

The participants or members of every group session were an equal mix of male and female residents of varied ages selected by the study team based on the following:

- Must have resided between 1979 and 2017 in any of the 27 barangays directly impacted by the study;
- Must have first-hand experience about the flooding episodes of Agusan River;
- Must not have been a respondent of the LADP HH survey.

The following were the participants for the FGD and KIIs:

i. Focus Group Discussions

- 5 directly affected barangays
- Women and youth of directly affected barangays
- Farmer's groups
- Homeowners in Resettlement Areas
- Butuan Chamber of Commerce and Industry

ii. Key Informant Interviews

- Engr. Sergio M. Mulawan, Jr., LAPD PMO OIC Project Manager
- Engr. Edgardo T. Sanchez, retired City Engineer
- Lorna A. David, City Assessor, City Hall
- Ayeth Guno, Ass't. Head, City Housing & Development Office
- Engr. Nolie C. Namocatcat, President, Agusan Del Norte Electric Cooperative
- Mr. Roger Ramirez, Sr., President, Butuan City Chamber Foundation, Inc. (BCCFI)
- Mr. John Uy, Proprietor, Marjeck Food Products maker of 3 Star Ice Cream
- Engr. Anselmo Sang Tian, General Manager, Butuan City Water District (BCWD)
- Carlito Alao, Resident, Initial Resettlement Area, Tiniwisan, Butuan City
- Romeo Mirasol, Resident, Pagatpatan Resettlement Area, Pagatpatan, Butuan City
- Pierre Anthony Joven, City Agriculturist
- Aida Olaso, Kagawad, Chairman-GAD, Mahogany, Butuan City
- Teodoro Olaivar, President, Mahay Farmers Association.

d. FGD/KII Instruments

A separate set of questionnaires was used for the KII and FGD sessions to triangulate the responses of the HH survey respondents. The instrument is included in the reports as Annex 2.

For the FGD, the following key focus questions/topics were discussed with the participants.

- *Describe to us what was it like when Agusan River overflowed from its banks before the dike/levee was built?*
- *How did you and your family endured the flooding experience?*
- *Did you undergo the same experience after the dike/levees were built?*

- *During project implementation, were there issues or concerns that you would have brought up to the contractor or to the LGU?*

C. Other Technical Methods Used

Geotagging

FREEDOM took initiative in Geotagging the flood control structures and facilities as well as the location of the household respondents in the HH survey.

Drone

A remotely-controlled umanned aircraft or drone equipped with a high-resoluton camers was utilized to take aerial photos of project structures that are not easily accessible by foot during the inventory stage like drainange channels and canals, creeks and rivers. The photos of the resettlement areas were useful in assessing the density of the houses and the status of the facilities like roads and canals. The bird's eye-view photos serve as visual information of the condition of the structures at the time of the study.

D. Limitations of the Primary Data Gathering Methods

In the HH survey, the enumerators noted some hesitation of some of the respondents in answering certain questions during interview who were mostly women (70.3%) as they were the ones who stayed in the house while the head of the family was out of the house to work or make a living.

Persons directly responsible in the planning, implementation, evaluation and maintenance of LAPD FCC are limited to two individuals as key informants, namely Engr. Sergio M. Mulawan, Jr. the Project Engineer of LAPD PMO during the last phase of the loaned portion of the project and currently the OIC Project Engineer of LADP, and Engr. Edgardo T. Sanchez, who was the City Engineer of Butuan City during the implementation of LAPD. As City Engineer, Engr Sanchez spearheaded flood control measures of the local government before the implementation of LAPD FCC.

E. Counterfactual Impact Evaluation

The LADP impact assessment distinguished, through counterfactual analysis, what difference the intervention brought to the beneficiary community as compared to a similar community without the intervention.

Objectives of the Counterfactual

The study aims to make a comparison between what actually happened and what would have happened in the absence of the intervention, as in the case, the flood control structures installed in Butuan City to increase its development potential and its surrounding areas by preventing floodwater from disturbing the city, as against the situation in Brgy. Hawilian, Municipality of Esperanza, Agusan del Sur that is continually affected by seasonal floods due to the absence of a flood control system.

Methodology of the CIE

Study Areas

The study areas are communities both located near the Agusan River. Figure 18 shows the location of the two communities, both are part of Caraga Region.

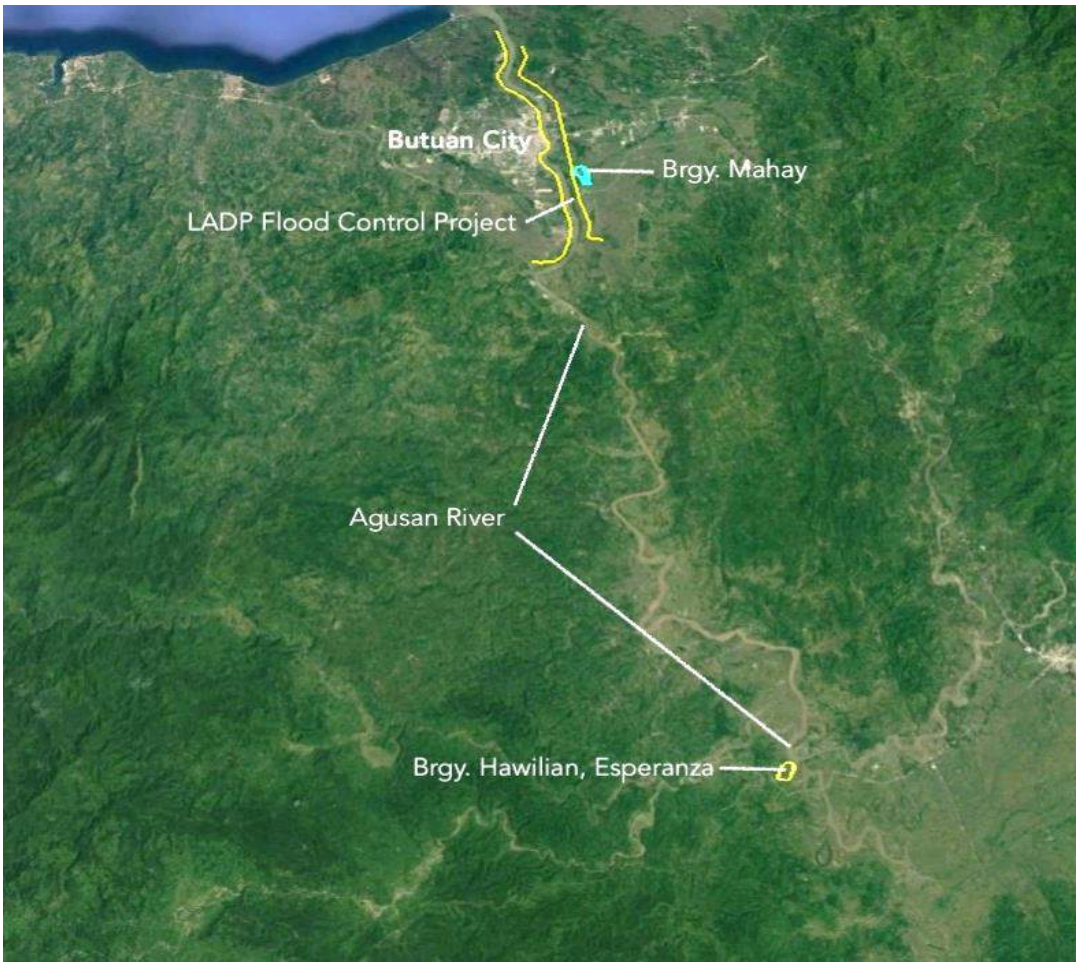


Figure 18. *Map showing the study areas.*

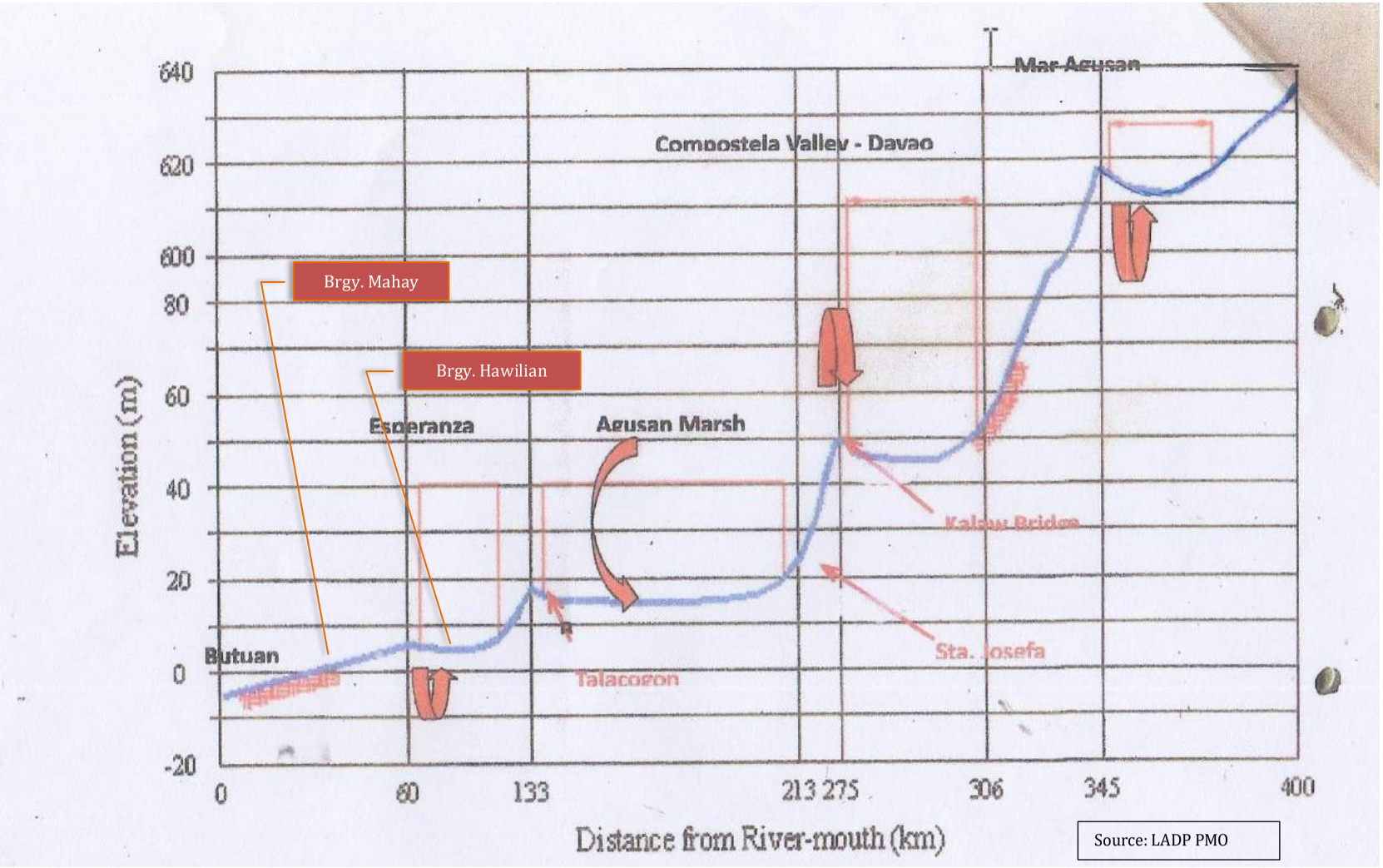


Figure 19. *Elevation and Distance of the study areas*

Figure 20. *Map showing location of Brgy. Mahay, Butuan City, the treatment group.*

Brgy. Mahay is located on the east bank of Agusan river, one of the rural barangays of Butuan City. Its 2015 population was 4,062. Residents are mostly engaged in agriculture and employment from institutions, companies, factories, while others earn a living through to odd jobs with no regular earnings. The area is across the Agusan River from the main commercial district of Butuan, and is currently protected by flood by the LADP East Bank Levee since 2009. A resettlement area is also located in the area.

Hawilian is about 30 kilometers upstream from Mahay, however the difference in elevation in only about 2-3 meters between the two communities. Figure 19 shows data provided by LADP PMO show the difference in elevation between Butuan (Mahay) is 0-3 meters AMSL while Esperanza (Hawilian) is 6 AMSL.

Figure 21. *Map showing location of Brgy Hawilian, comparison group*

Brgy. Hawilian is located on the west bank of Agusan river, one of the 47 barangays of the Municipality of Esperanza, Agusan del Sur. Its 2015 population was 2,666. Residents are mostly engaged in farming. The area is across the Agusan River from the Poblacion of Esperanza, and is currently under threat from seasonal flood from Agusan River.

Target Population

The aim of the study is to determine the impacts of LADP Flood Control Project in Butuan City, and how it helps alleviate the condition in the area. The approach was to compare the over-all welfare of those communities living under LADP Flood Control Project, and those communities who have not received any intervention to combat the frequent and intense flooding in the surrounding area of Agusan River.

The target population are those households in Butuan City who have resided near the river before the implementation of LADP (1980-1988) and up to the present time (2010-2018). There are two groups considered in the study to better define the impacts of the project. Thus, the study also looked for a community who have the same dilemma, however, there is still no intervention implemented in their area. Brgy. Hawilian in the Municipality of Esperanza, Agusan del Sur, about 30 kms upstream from Butuan City as among those identified barangays that suffered from frequent and disastrous flooding due to the waters from the river. However, no projects and intervention have been implemented to help ease the impacts of flooding there.

Sample Size and Sampling Design

The study employed a descriptive research design, and made use of a quantitative approach of collecting and analyzing gathered information and as means of examining the research problem. A survey was conducted to describe the past and current socio-economic condition of residents from

Brgy. Mahay Butuan City (directly impacted by Lower Agusan Development Project) and Brgy. Hawilian, Municipality of Esperanza (flood-prone area with no development project).

The total number of households (N) from these areas was identified and the sample size (n) was computed using the formula for estimating proportion, which is given by

$$n = \frac{N\left(z_{\alpha/2}\right)^2 pq}{(N-1)ME^2 + \left(z_{\alpha/2}\right)^2 pq}$$

, where n is the sample size, N is the total number of respondents in the area, $z_{\alpha/2} = 1.96$ at 0.05 level of significance, $p = q = 0.5$, and the margin of error is $ME = 0.08$. Table 8 below show the sample size of respondents in every study area.

Table 8. *Sample size per study area*

Survey Area	Total No. of Household. N[a]	Sample Size, n
Brgy. Mahay, Butuan City	862	141 (computed n=128)
Brgy. Hawilian, Municipality of Esperanza	925	130
Total	1787	271

Legend: [a] Data source: Census of Population 2015

Two-stage cluster sampling design was then employed to locate these number of respondents in the area. From those identified barangays that are directly affected by flooding due to the overflowing water from Agusan River, clustering was done according to whether a barangay is part of the LADP or not. This is the first stage of random selection where Brgy. Mahay in Butuan City was selected from the cluster where the intervention was implemented, and Brgy. Hawilian in Esperanza from the cluster which composed of barangays that received no intervention against flooding. The second stage of random selection is identifying household heads for each of these barangays through simple random sampling.

Survey Instrument

The collection of data from the area aims to evaluate the condition of the community who were affected by flooding before, and as well as to evaluate their current state. The survey instrument that was used for the study is comprised of twelve (12) parts, namely:

A. Demographic Profile
B. Household Profile
C. Income, Property and Ownership
D. Household Facilities and Resources
E. Health Condition
F. Physical and Communication Infrastructures
G. Mode of Transportation
H. Membership to Organization/ Association
I. Financial/ Credit Sources in the Community
J. Institutional Support and Programs
K. Flood Impact to the Household
L. Flood Impact to Agriculture

Measuring the Over-all Level of Welfare or the Impact of Lower Agusan Development Project (LADP) in Butuan City

To capture whether or not the LADP flood control structures built by the government has an over-all positive impact to the community, a Counterfactual Impact Evaluation (CIE) study was conducted. CIE seeks to identify net effects or impacts of an intervention, which in this case is the LADP-FCC in Butuan City. The evaluation is done by comparing the over-all condition of a group that received an intervention (treatment) from a group with no intervention at all (comparison). The deviation of the over-all condition of those who are in the comparison group from the condition under the treatment group is the basis to obtain the estimates of the counterfactual results. The estimates refer to the magnitude of impacts, and

determines the direction (sign) whether it has a positive and negative effects. In this study, these two types of group that were subject for evaluation were identified as follows:

- **Treatment group**: Residents from Brgy. Mahay Butuan City who were identified to be directly impacted and were recipients of development project, i.e. the LADP, to combat the impacts of frequent and intense flooding in the area due to overflowed water from Agusan River.
- **Comparison group:** Residents from Brgy. Hawilian, Municipality of Esperanza, Agusan del Sur who were among those identified by the local government as directly and intensely affected by flood from Agusan River.

Based on CIE principle, these two groups must be similar as much as possible in all respects except for the intervention being received by the treatment group. These two groups were carefully examined so that the evaluation will not suffer from selection bias, which in that case, will forfeit the objective of CIE. These two groups identified are similar in the following aspect:

- Both are rural barangays comprising 862 and 925 households in Brgy. Mahay and Brgy. Hawilian, respectively.
- Both groups are still identified as agricultural areas.
- Both areas are directly facing the Agusan River, thereby directly affected by the overflowing water from the river.

Moreover, comparison tests with the profile of the households from the two study areas were conducted to ensure that the aforementioned groups are statistically equal. Particularly, the treatment and comparison groups were being compared in their economic condition (monthly income, ownership, and availability of financial and credit sources), health status (access to health facilities and structures, access to health care and services, and illnesses and/or diseases experience) and social engagements (affiliation to organization, and availability of institutional support and programs).

a. Counterfactual Impact Evaluation Design: After-only Experimental Design with Comparison Group

There are recommended ways to set-up the study in order to obtain the counterfactual results. In this study, the design used was the *After-only Experimental Design with Comparison Group*. With this design, characteristics and profile of the two groups (i.e., the treatment and comparison groups) are made sure to be statistically equivalent in all respects at the time when there was still no intervention applied (i.e., apart from determining the profile of the respondents and conducting an initial assessment to check whether these two study areas are more likely similar, a comparison test was also performed to determine their statistical equivalence). The baseline information about these groups are determined on the basis of respondents' recall of the situation before the project was implemented. The condition of the treatment group is then measured after the implementation of the project in the area, whereas the comparison group is measured without having been exposed to the impact of the same project. Consequently, the impact of the project is determined after measuring the difference between the baseline data (before) and the 'after' data of these two groups. The design is appropriate to use given that the LADP was already established in Butuan City before 2010, and this study wants to measure the impact of the project to the community.

b. Randomized Selection of Study Participants: Propensity Score Matching Method

The study participants both came from barangays which are exposed and non-exposed to the development project (LADP). The living condition and welfare of these individuals prior to the times that LADP was implemented in Butuan City were also determined and assessed. A comparison group is then formed and selected from the group of those individuals who are living in the barangay that is not exposed to the development project (Brgy. Hawilian, Esperanza), while the treatment group was constructed from those individual who are residing in the area with the intervention of LADP (Brgy. Mahay, Butuan City). The classification of these individuals is done using the propensity score matching (PSM) method.

PSM method seeks to identify the individuals under the comparison group such that it matches the individuals belong to the treatment group. The matches are selected according to the similarities of these two groups on some observable characteristics, that is, determining the classification of each study participant which is conditional to some observable factors. Given below were the steps followed in propensity score matching:

1. Every study participant must be identified whether they came from the treatment (Brgy. Mahay, Butuan City) or the comparison group (Brgy. Hawilian, Esperanza).
2. A logit regression was performed to come up with a predictive model for classification, a function of some observable characteristics or factors. These factors are considered to have influenced the classification of respondents whether they are exposed to the development project or not. This includes the respondent's socio-economic and health condition.
3. The predictive model was used to generate propensity score (probability of classification, P[x_i]) for all individuals regardless whether they belong to the treatment and comparison group.
4. Identifying the match pairs or delineating the 'common support' region. Samples or the individuals who were subject for further analysis to determine the impacts of LADP were identified by restricting and considering those individuals that are matched or within the 'common support' region.
5. Impacts of LADP is determined by comparing the over-all welfare or condition of those individuals from the treatment and comparison groups. In here, the Difference-in-Difference methodology and comparing the mean welfare or condition of the two groups using t-tests were performed to estimate and compare the impacts.

c. Measuring the over-all welfare of two groups using a composite index

Human welfare or well-being relates to the quality of life and is influenced by economic, social, political and environmental factors. This is one component of defining development which according to the United Nations, means 'to lead long and healthy lives, to be knowledgeable, to have access to the resources needed for a decent standard of living and to be able to participate in the life of the community'. Welfare entails a multidimensional definition. Based on academic research and references, defining welfare should consider the following, simultaneously: (a) Material living standards ((income, consumption and wealth); (b) Health; (c) Education; (d) personal activities including work; (e) political voice and governance; (f) social connections and relationship; (g) environment; and (h) insecurity of an economic and physical nature (Stiglitz, JA. et al., 2009)

In this study, the impacts of LADP were described through measuring the over-all welfare (condition with or without the project) of two groups. The over-all welfare is represented by an index which is obtained by considering different components with indicators to be assessed from every respondent.

i. Selection of indicators

Several indicators were considered in the study in order to measure the impacts of LADP-FCC. Here, a composite index was calculated which stands as the over-all welfare of the households with and without the project. The selected indicators from each component is given in the table below.

Table 9. Indicators used for measuring the over-all welfare

Component	Indicators	Relationship to Over-all Welfare/ Condition (+,-)
Economic, E	Household Monthly Income	+
	House ownership	+
	Land Ownership	+
	Availability of financial and credit sources	+
Health, H	Illnesses and/or diseases experience	-

Component	Indicators	Relationship to Over-all Welfare/ Condition (+,-)
	Access to health facilities and structures (e.g. rural health unit, botika ng barangay, herbolaryo, private clinic, hospitals)	+
	Access to health care and services (e.g. medicine and check-up)	+
Physical and Communication Infrastructures, PCI	Presence of physical infrastructures (e.g roads, bridge, schools, churches, market, barangay hall, covered basketball court, community park, irrigation, water reservoir, multipurpose hall)	+
	Presence of communication infrastructures (e.g. cellphone, radio, internet, landline)	+
	Availability of different modes of transportation (e.g. motor, bus, pedicab, etc.)	+
Social Engagements, SE	Membership to organization (e.g. religious, government, socio-civic, socio-political, microfinance, etc)	+
	Availability of institutional support and programs (e,g. BLGU, LGU, DA, DSWD, DENR, etc.)	+
Personal Experience and Perception towards Flooding, PE	Indicators on experience during flooding, and assistance received from different institutions	+ and -
Impacts on Agriculture, A	Impacts to crops and other livelihood	+ and -
	Loss and damages	+ and -
	Recovery and coping up	+
	Support and assistance	+

ii. Normalization of data

The study involves indicators with different units of measure or scale. Thus, normalization of the data is needed prior to any aggregation as the indicators may have different measurement units (OECD, 2008). Using the indicators, the raw values were normalized using the Min-Max Normalization Method. This method normalizes indicators to have a value from 0 to 1. The normalized indicator scores (Ii) were combined together to generate the scores/ rating for the over-all value for each component of welfare (condition in the area with or without the project) of households in the area.

Not all indicators has a positive effect to the welfare in the area *(as indicated in Table 9)*. Thus, the effect of an indicator to the over-all welfare was also taken into consideration. If an indicator has a negative impact, the values under that indicator was transformed into its reversed value. For indicators with positive influence to the over-all welfare, the raw values are used and are directly subject to normalization process.

If a certain indicator has a positive effect to the over-all welfare, the normalization was calculated as follows:

$$I_i = \frac{X_i - MinX_i}{MaxX_i - MinX_i}$$

where X_i is the actual value, $MinX_i$ is the minimum value, and $MaxX_i$ is the maximum value of the indicator.

On one hand, if an indicator has a negative effect, the normalization was calculated as follows:

$$I_i = \frac{MaxX_i - X_i}{MaxX_i - MinX_i}$$

where X_i is the actual value, $MinX_i$ is the minimum value, and $MaxX_i$ is the maximum value of the indicator.

iii. Weighting and aggregation

To get the score (sub-index) for every component, the normalized values of all of its indicators were averaged.

The study employed equal weights in aggregating the scores obtained from the different components. This is used to come up with a composite index, W, which represents the over-all welfare in the area. This is given by

$$W = 0.167E + 0.167H + 0.167PCI + 0.167SE + 0.167PE + 0.167A$$

Or

$$W = \frac{E + H + PCI + SE + PE + A}{6}$$

Where W is the over-all welfare in the area; E, H, PCI, SE, PE, and A are the sub-index values under the economic, health, physical and communication infrastructures, social engagement, personal experience, and impact on agriculture components, respectively.

d. Counterfactual Estimation

i. Difference-in-Differences (DiD) Estimation Approach (Comparison of Means)

To measure the impacts of LADP, the measure of the over-all welfare of those who resided in Brgy. Mahay, Butuan City (treatment group) is compared to the over-all welfare from those living in Brgy. Hawilian, Esperanza (comparison group, counterfactual results). The difference-in-differences estimation approach was used to obtain an estimate of the impact of LADP wherein the difference in a result before and after in the comparison group is subtracted the same difference observed in the treatment group (Gertler, PJ., et al., 2011).

The DiD impact estimator is given by

$$Net\ impact\ of\ LADP = \left(W_{T,After} - W_{C,After}\right) - \left(W_{T,Before} - W_{C,Before}\right)$$

Where $W_{T,After}$ and $W_{C,After}$ are the welfare/ condition of the treatment group and comparison group after the implementation of LADP, respectively; $W_{T,Before}$ and $W_{C,Before}$ are the welfare/ condition of the treatment group and comparison group before the implementation of LADP, respectively.

If DiD estimate would result to a positive value, this implies that the LADP has a positive net impacts to the community. Otherwise, the project has no significant effect at all.

e. Comparison of Condition in Study Areas Before and After the Implementation of LADP

From the approach used to determine the counterfactual results/ estimate, this study further determine whether there is significant difference in the condition and status of respondents with respect to different components. Paired samples t-tests were performed in order to determine whether there is a significant difference in the welfare (different welfare components) in Brgy. Mahay, Butuan City (treatment group) before (1980-1988) and after (2010-2018) the implementation of LADP in the area. Similarly, same tests were done in Brgy. Hawilian, Esperanza (comparison group) during these timeframes.

On one hand, to capture whether the condition in the treatment group is significantly different from the comparison group, independent samples t-tests were performed for the different components of welfare defined in this study.

Limitations of the CIE study

1. The study considered household heads (or spouse of household heads) to be the respondents of the survey. One inclusion criterion followed is making sure that the respondents must be at least 55 years old and above by the time that the survey was conducted.

2. The mode of gathering the data was a one-to-one interview where respondents also asked to recall their living condition before the LADP was implemented. There was no baseline information retrieved on the living condition and socio-economic profile of those communities considered in the study.

3. Selecting study groups and respondents. The study employed a two-stage cluster sampling design. From those identified barangays that are directly affected by flooding due to the overflowing water from Agusan River, clustering was done according to whether a barangay is part of the LADP or not. This is the first stage of random selection where Brgy. Mahay in Butuan City was selected randomly from the 44 barangays (clusters) that are identified to be directly affected with flooding due to overflowing water from Agusan River and where the intervention was implemented. On the other hand, Brgy. Hawilian in Esperanza from the cluster which composed of barangays that received no intervention against flooding. The second stage of random selection is identifying household heads from each of these barangays through simple random sampling.

4. Methodology
    a. Study research design: the *After-only Experimental Design with Comparison Group*. With this design, characteristics and profile of the two groups (i.e., the treatment and comparison groups) are made sure to be statistically equivalent in all respects at the time when there was still no intervention applied (i.e., apart from determining the profile of the respondents and conducting an initial assessment to check whether these two study areas are more likely similar, a comparison test was also performed to determine their statistical equivalence). The baseline information about these groups are determined on the basis of respondents' recall of the situation before the project was implemented. The condition of the treatment group is then measured after the implementation of the project in the area, whereas the comparison group is measured without having been exposed to the impact of the same project. Consequently, the impact of the project is determined after measuring the difference between the baseline data (before) and the 'after' data of these two groups. The design is appropriate to use given that the LADP was already established in Butuan City before 2010, and this study wants to measure the impact of the project to the community.

    b. The study considered two approaches in determining the statistical equivalence of study groups: Propensity Score Matching (PSM) method and the significant difference test (independent samples t-test).

    c. Measuring the over-all welfare of respondents was presented through a composite index. This is to consider the different observable characteristics or components that the respondents possessed. In the study, the economic, health, physical and communication infrastructures, social engagements, and perception about flooding incidence and experience are among those observable factors considered.

    d. Equal weights for each component were employed. Possible level of importance of each component to the determination of the communities' over-all welfare was not considered in the study.

    e. Additive aggregation of component indices was used to calculate the over-all welfare index.

    f. Counterfactual Estimation. Difference-in-Differences (DiD) approach was used to obtain the net impacts of LADP. Further, a significant difference tests was also performed to compare the conditions of these study groups.

Results and Discussion of the Counterfactual

This section presents the results and findings of the impact assessment of LADP using the counterfactual approach.

A. Profile

1. Demographic Profile

Tables A.1 and A.2 indicate the demographic profile of respondents from the two study areas. This includes the sex, civil status, educational attainment, religious affiliation, ethnicity, age and the number of years of residence of respondents in the area.

Majority from both areas were female comprising 66.7% and 70.8% of the total respondents in Butuan City and Esperanza, respectively. Further, majority of the respondents were married comprising 77.3% (Butuan City) and 66.9% (Esperanza) from those who were interviewed. There were around 21% of total respondents in Butuan City have attained tertiary education, while only 2.3% in Esperanza. Higher percentage of these respondents have only attained up to elementary education (38.3% in Butuan City and 60.8% in Esperanza).

Moreover, majority of the respondents from these areas were affiliated to Roman Catholic comprising 90.07% and 74.6% in Butuan City and Esperanza, respectively. Majority from the respondents (83.69%) in Butuan City were Cebuanos, while 59.2% of total respondents in Esperanza were Lumad.

Table A.1 Demographic profile of respondents from the study areas

Variables	Categories	Butuan City		Esperanza		Total	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Sex	Male	47	33.3	38	29.2	85	31.4
	Female	94	66.7	92	70.8	186	68.6
Civil Status	Single	4	2.84	6	4.6	10	3.7
	Married	109	77.30	87	66.9	196	72.3
	Widow	20	14.18	28	21.5	48	17.7
	Separated	2	1.42	3	2.3	5	1.8
	Live-in	6	4.26	6	4.6	12	4.4
Educational Attainment	No Formal Education	3	2.13	3	2.3	6	2.2
	Elementary	54	38.30	79	60.8	133	49.1
	High School	50	35.46	44	33.8	94	34.7
	College	31	21.99	4	3.1	35	12.9
	Vocational/ Technical	3	2.13	0	0	3	1.1
Religious Affiliation	Roman Catholic	127	90.07	97	74.6	224	82.7
	Protestant	9	6.38	14	10.8	23	8.5
	Islam	1	0.71			1	0.4
	Iglesia ni Cristo	0	0.00	1	0.8	1	0.4
	Jehovah's Witnessess	4	2.84	18	13.8	22	8.1
Ethnicity	Cebuano	118	83.69	38	29.2	156	59.1
	Ilocano					0	0.0
	Pangasinense	0	0.00	1	0.8	1	0.4
	Waray-waray	1	0.71	9	6.9	10	3.8
	Surigaonon	1	0.71	5	3.8	6	2.3
	Lumad	14	9.93	77	59.2	91	34.5

Table A.2 Age and the number of years of residence of respondents in the study areas

Variable	Butuan City	Esperanza
Age (in years, mean ± standard deviation)	58.67 ± 9.11	58.76 ± 9.17
No. of years of Residence (mean ± standard deviation)	21.93 ± 19.55	43.25 18.38

2. Household Profile

The household profile of the respondents in two study areas is presented in Table A.3. The table shows the composition of the household indicating the no. of infants, children, adult, senior citizen and person with disability (PWD) in the household. As shown, the average household size in these areas was five (5), while there were households in Butuan City and Esperanza with 13 and 12 members, respectively.

Table A.3 Household profile of respondents from the study areas

Variable	Butuan City	Esperanza
Average no. of Infant (maximum no. of infants in the household)	0 (4)	0 (6)
Average no. of children (maximum no. of children in the household)	1 (8)	2 (6)
Average no. of Adult (maximum no. of adults in the household)	3 (10)	3 (12)
Average no. of senior citizen (maximum no. of senior citizen in the HH)	1 (3)	1 (2)
Average no. of PWD (maximum no. of PWD in the household)	0 (2)	0 (2)
Household Size (maximum household size)	5 (13)	5 (12)

3. Income, Property, and Ownership

Table A.4 indicates the average household's monthly income and ownership from study areas before (1980-1988) and at the current times (2010-2018). Respondents from Butuan City were earning PhP 6,774.39 per month on the average before, and during 2010-2018, these households are earning PhP 12, 218.82 per month on the average.

On the other hand, respondents from Esperanza were earning PhP 5,560.12 and PhP 7,665.19 per month on the average before (1980-1988) and at the current times (2010-2018), respectively.

Table A.4 Household's monthly income and ownership of respondents from different study areas before (1980-1988) and at the current times (2010-2018)

Variables	Butuan City		Esperanza	
	Before	After	Before	After
Average household monthly income	6,774.39	12,218.82	5,560.12	7,665.19
Average no. of owned house unit per household	1	1	1	1
Average no. of owned lots per household	1	1	1	1

4. Health Condition

Common illnesses/ health condition experienced by households are presented in Table A.5. Cough and colds, and fever are found to be the common illnesses experienced by most households from both areas.

Table A.5 Distribution of respondents for the common illnesses/ health condition experienced by households before (1980-1988) and at the current times (2010-2018)[a]

Illness/ Health Condition	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Arthritis	21	14.9	59	41.8	14	10.8	40	30.8
Birth Complications	8	5.7	3	2.1	7	5.4	3	2.3
Bronchitis	5	3.5	3	2.1	0	0	0	0
Chicken Pox	29	20.6	4	2.8	23	17.7	10	7.7
Cholera	5	3.5	4	2.8	4	3.1	3	2.3
Cough and Colds	128	90.8	125	88.7	122	93.8	123	94.6

Illness/ Health Condition	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Dengue	11	7.8	10	7.1	8	6.2	12	9.2
Diabetes	10	7.1	24	17	5	3.8	9	6.9
Diarrhea	51	36.2	48	34	36	27.7	24	26.2
Fever/ Flu	119	84.4	116	82.3	117	90	120	92.3
Headache/Migraine	87	61.7	89	63.1	77	59.2	80	61.5
Heart Disease	9	6.4	16	11.3	4	3.1	9	6.9
Hepatitis	2	1.4	1	0.7	0	0	1	0.8
Hypertension	13	9.2	46	32.6	15	11.5	48	36.9
Kidney Problem	5	3.5	11	7.8	11	8.5	19	14.6
Leprosy	1	0.7	2	1.4	0	0	0	0
Leptospirosis	1	0.7	0	0	0	0	1	0.8
Malaria	6	4.3			16	12.3	3	2.3
Measles	14	9.9	2	1.4	12	9.2	3	2.3
Schistomiasis	1	0.7	1	0.7	1	0.8	2	1.5
Sexually transmitted disease	0	0	1	0.7	0	0	0	0
Skin Infection/ disease	24	17	19	13.5	7	5.4	12	9.2
Tuberculosis			2	1.4	2	1.5	1	0.8
Typhoid Fever	6	4.3	4	2.8	2	1.5	4	3.1
UTI	15	10.6	39	27.7	18	13.8	54	41.5

Legend: [a] distribution of respondents as shown in Table A.5 is relative to the respective sample size in the area

Presented in Table A.6 is the frequency of availing medicine (per month) of respondents from their health units/ 'botika'. As shown, most of the respondents both from different study areas have only availed free medicine once in every month.

Table A.6 Frequency of availing medicine per month of respondents from different study areas before (1980-1988) and at the current times (2010-2018)

Frequency of availing medicine per month	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Never	47	33.3	55	39	41	31.5	27	20.8
Once	65	46.1	63	44.7	60	46.2	60	46.2
Twice	15	10.6	10	7.1	15	11.5	15	11.5
Thrice	2	1.4	3	2.1	3	2.3	5	3.8
Always[a]	12	8.5	10	7.1	11	8.5	23	17.7
Total	141	100	141	100	130	100	130	100

Legend: [a] Always pertains to availing medicine every week (i.e., 4 or 5 times in a month)

On one hand, shown in Table A.7 is the frequency of check-up (per month) of respondents from different study areas. Similar to availing free medicine, most of the respondents have done check-up in their local health units once in every month.

Table A.7 Frequency of check-up per month of respondents from different study areas before (1980-1988) and at the current times (2010-2018)

Frequency of check-up per month	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Never	51	36.2	43	30.5	41	31.5	28	21.5
Once	55	39	58	41.1	55	42.3	57	43.8
Twice	11	7.8	6	4.3	12	9.2	11	8.5
Thrice	4	2.8	7	5	3	2.3	5	3.8
Always[a]	20	14.2	25	17.7	19	14.6	29	22.3
Total	141	100	141	100	130	100	130	100

Legend: [a] Always pertains to availing medicine every week (i.e., 4 or 5 times in a month)

Table A.8 indicates the accessibility, in terms of the number of minutes, to reach the health units known in the area such as the rural health unit (RHU), *botika ng barangay*, local *hilot*, private clinic and public hospital. As observed, it would be more accessible to travel and reach these health units nowadays compared before. This situation has an implication of developed road infrastructure in the area at the current times *(see Table A.10)*.

Table A.8 Accessibility (in minutes) of different health units in the area as observed by the respondents before (1980-1988) and at the current times (2010-2018)

Health Units	Timeframe	Accessibility (in minutes)					
		Butuan City		Esperanza		Total	
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
RHU	Before	14.32	12.27	5.38	4.14	10.01	10.30
	After	10.21	6.32	5.68	5.32	8.06	6.28
Botika ng Barangay	Before	11.16	7.19	6.09	5.2	8.53	6.72
	After	9.7	5.72	4.92	4.34	7.22	5.58
Local 'Hilot'	Before	13.27	19.72	4.89	4.19	9.24	15.02
	After	9.53	16.09	4.28	3.79	7.02	12.18
Private Clinic	Before	17.21	14.34	6.87	4.21	15.25	13.63
	After	9.61	6.67	5.2	8.44	8.90	7.12
Public Hospital	Before	24.16	17.89	51.88	21.55	41.74	24.27
	After	14.3	8.21	26.87	13.88	21.76	13.40

5. Physical and Communication Infrastructure

Table A.9 shows the physical and communication infrastructure present in the study areas as observed by respondents. As shown, most of these infrastructures are more visible and established in the current times as observed by the respondents.

Table A.9 Distribution of respondents for the physical and communication infrastructure observed in the area before (1980-1988) and at the current times (2010-2018)[a]

Infra-structures	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Barangay Hall	133	94.3	140	99.3	116	89.2	127	97.7
Bridge	121	85.8	140	99.3	64	49.2	111	85.4
Cellphone	17	12.1	121	85.8	5	3.8	103	79.2
Church	134	95	139	98.6	120	92.3	125	96.2
Covered Basketball Court	79	56	136	96.5	73	56.2	103	79.2
Community Park	21	14.9	43	30.5	12	9.2	42	32.3
Internet	12	8.5	98	69.5	4	3.1	58	44.6
Irrigation	29	20.6	64	45.4	11	8.5	61	46.9
Landline	10	7.1	12	8.5	4	3.1	5	3.8
Market	7	5	10	7.1	9	6.9	43	33.1
Multipurpose Hall	64	45.4	131	92.9	65	50	113	86.9
Radio	125	88.7	114	80.9	112	86.2	97	74.6
Concrete Roads	118	83.7	137	97.2	99	76.2	116	89.2
Schools	137	97.2	139	98.6	119	91.5	122	93.8
Water Reservoir	47	33.3	84	59.6	27	20.8	82	63.1

Legend: [a] distribution of respondents as shown in Table A.9 is relative to the respective sample size in the area

6. Mode of Transportation

Shown in Table A.10 is the different modes of transportation available in the area as observed by respondents. As shown, motorcycle is the common vehicle as observed by most respondents from Butuan City and Esperanza. Moreover, most of these mode of transportation found to be more visible and operational in the current times except for the animal-driven transportation where it is seen to be decreasing in Butuan City.

Table A.10 Mode of transportation available in the area as observed by respondents before (1980-1988) and at the current times (2010-2018)

Mode of Transportation	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Motorcycle (single)	81	57.4	129	91.5	67	51.5	116	89.2
Pedicab/Padyak/Trisikad	68	48.2	77	54.6	19	14.6	56	43.1
Motor Tricycle	58	41.1	98	69.5	44	33.8	88	67.7
Jeep	42	29.8	52	36.9	24	18.5	35	26.9
Multicab	27	19.1	61	43.3	10	7.7	26	20
Bus	3	2.1	15	10.6	3	2.3	13	10
Animal-driven transportation	35	24.8	19	13.5	52	40	38	29.2
Tramline	0	0	0	0	2	1.5	6	4.6

Legend: [a] distribution of respondents as shown in Table A.10 is relative to the respective sample size in the area

7. Membership to Organization/ Association

Membership of respondents (and/or members of the household) to organization/ association before and at the current times is presented in Table A.11. Most of the households in Butuan City were affiliated to religious organization, microfinance and senior citizen association. On one hand, most of the respondents in Esperanza were affiliated to microfinance, senior citizen and women's organization.

Table A.11 Membership of respondents to organization/ association before (1980-1988) and at the current times (2010-2018)[a]

Organization	Position	Butuan City				Esperanza			
		Before		After		Before		After	
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Religion	Member	36	25.5	26	18.4	15	11.5	19	14.6
	Officer	10	7.1	7	5.0	2	1.5	1	0.8
Government	Member	7	5.0	9	6.4	11	8.5	24	18.5
	Officer	4	2.8	7	5.0	1	0.8	2	1.5
Socio-civic	Member	4	2.8	7	5.0	2	1.5	10	7.7
	Officer	1	.7	1	.7	1	0.8	1	0.8
Socio-political	Member	1	.7	0	.0	0	0	0	0
	Officer	1	.7	1	.7	0	0	0	0
Microfinance	Member	15	10.6	34	24.1	4	3.1	43	33.1
	Officer	2	1.4	3	2.1	5	3.8	0	0
Transportation	Member	4	2.8	3	2.1	0	0	1	0.8
	Officer	0	0	0	0	0	0	0	0
Labor	Member	0	0	1	.7	0	0	0	0
	Officer	0	0	0	0	0	0	0	0
Senior Citizen	Member	3	2.1	44	31.2	0	0	41	31.5
	Officer	3	.7	2	1.4	3	2.3	1	0.8
Women	Member	7	5.0	8	5.7	9	6.9	32	24.6
	Officer	4	2.8	3	2.1	1	0.8	2	1.5
Youth	Member	6	4.3	0	0	1	0.8	0	0
	Officer	0	0	0	0	2	1.5	0	0
PWD	Member	1	.7	2	1.4	0	0	0	0
	Officer	1	.7	1	.7	0	0	0	0

Legend: [a] distribution of respondents as shown in Table A.11 is relative to the respective sample size in the area.

8. Financial/ Credit Sources in the Community

Table A.12 shows the distribution of respondents for the financial and/or credit sources available in the area before and at the current times. These financial and/or credit sources available are cooperative(s), bank(s), private lender(s), and microfinance institutions.

Table A.12 Financial/ Credit sources available in the community before (1980-1988) and at the current times (2010-2018)[a]

Financial and Credit Sources	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Cooperative	32	22.7	37	26.2	35	26.9	53	40.8
Bank	15	10.6	14	9.9	5	3.8	13	10.0
Private Lender	36	25.5	48	34.0	23	17.7	41	31.5
Microfinance	32	22.7	58	41.1	20	15.4	62	47.7

Legend: [a] distribution of respondents as shown in Table A.12 is relative to the respective sample size in the area

9. Institutional Supports and Programs

Table A.13 indicates the distribution of respondents for the institutional supports and/or programs received/ availed before and at the current times. Most respondents both in Butuan City and Esperanza have received/ availed the supports and/ or programs from the Barangay local government unit (BLGU) and city/ municipality LGU, although there is an increasing number of households who have availed these supports from different institutions through times.

Table A.13 Institutional supports and/or programs received by the respondents before (1980-1988) and at the current times (2010-2018)

Source of Support	Butuan City				Esperanza			
	Before		After		Before		After	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Barangay LGU	65	46.1	74	52.5	70	53.8	88	67.7
City/ Municipality	45	31.9	53	37.6	61	46.9	76	58.5
DA	18	12.8	20	14.2	23	17.7	38	29.2
DAR	3	2.1	4	2.8	4	3.1	9	6.9
DENR	7	5.0	8	5.7	5	3.8	13	10.0
DSWD	24	17.0	38	27.0	29	22.3	53	40.8
DOLE	2	1.4	3	2.1	1	0.8	3	2.3
DPWH	4	2.8	11	7.8	2	1.5	5	3.8
NGO	6	4.3	6	4.3	2	1.5	3	2.3

10. Flood Impacts

Impacts of flooding to the households before and at the current times as perceived by the respondents is shown in Table A.14. Respondents were asked to give their ratings, from 1 (lowest score/ intensity) to 5 (highest score/ intensity), for every indicator that measure and determine their perception on the impacts of flooding to their household before and during these current times. It can be observed that impacts of flooding have become not so serious during these current times in Butuan City (when LADP was established in the area) as the results show relatively lower scores (lower intensity of impacts) compared to the scores given for their situation before. On the other hand, impacts of flooding has continuously disturbing the area in Brgy. Hawilian in Esperanza as it is shown in the results that the scores are consistently high even at the current times.

Table A.14 Impacts of flooding to the households before (1980-1988) and at the current times (2010-2018) as perceived by the respondents

Indicators	Butuan City				Esperanza			
	Before		After		Before		After	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
1. How high was the water level when flooding strikes the area?	4.45	0.79	2.48	1.24	4.65	0.74	4.52	0.70
2. How fast did you evacuate?	4.06	1.07	2.17	1.14	4.51	0.97	4.44	0.96
3. How affected were you during the flood?	4.31	1.11	2.52	1.30	4.75	0.73	4.64	0.74
4. How afraid were you?	4.31	1.05	2.73	1.46	4.75	0.64	4.62	0.65
5. How afraid were the women?	4.27	1.16	2.74	1.47	4.63	0.85	4.48	0.93
6. How afraid were the children?	4.16	1.26	2.61	1.41	4.64	0.84	4.47	0.93
7. Rate the damage your house sustained	3.50	1.27	2.14	1.05	4.03	1.17	3.77	1.12
8. How much did you lose in your income due to floods?	4.00	1.24	2.63	1.43	4.43	0.99	4.38	0.88
9. How prepared are you about flood emergency?	3.90	1.25	3.47	1.45	4.43	0.97	4.58	0.80
10. How responsive and organized the barangay officials informing you about flood hazard?	4.21	1.16	4.14	1.16	4.53	0.83	4.66	0.72

For respondents in Butuan City, they were asked about the extent of help/ impact of LADP to their living condition in general. On the average, respondents gave a score of 4.30, which can be interpreted that the project brought higher positive impacts to the community.

On the other hand, respondents were asked to rate for the possible impacts when flood dikes project, similar to LADP, will be put up in the area. The results yield to an average score of 4.73, and describes a high positive impacts of the project to the community.

Table A.15 Extent of help of LADP (or flood dike) as perceived by respondents from different study areas

Indicator	Butuan City		Esperanza	
	Mean	Std. Deviation	Mean	Std. Deviation
Extent of help of LADP (or dike) in protecting you and your family	4.30	1.25	4.73	0.90

B. Randomized Selection of Study Participants

One of the important assumptions before conducting the impact assessment is to make sure that the treatment and comparison groups are more likely similar in most aspects to avoid bias in the findings. Apart from the initial assessment done in these areas, it is also necessary that the selection of study participants is random, and that the initial state of these individuals must be statistically equal.

i. Propensity Score Matching

The propensity score matching was used to identify those individuals who will be part of the two groups. Part of the survey is to let the respondents recall their living condition when there was no or any development projects in the area to combat the intense flooding. Those indicators were considered to

develop a predictive model of classification through logit regression approach. With the model, this was used to generate the propensity score for each member of treatment and comparison group. Table B.1 shows the predictive model for classification through logit regression.

Table B.1 Predictive model (logit) for classification with the observable characteristics

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Sex (reference category: Male)	1.040	1.120	.862	1	.353	2.829
Monthly income	.000	.000	.141	1	.707	1.000
No. of Lot Units	1.207	1.037	1.356	1	.244	3.343
No. of financial and credit sources in the area	-1.281	.543	5.567	1	.018**	.278
No. of diseases/ illnesses experience	-.186	.211	.783	1	.376	.830
Accessibility to rural health unit (in min)	.259	.089	8.484	1	.004***	1.295
Accessibility to near *Botika* (in minutes	.158	.084	3.508	1	.061*	1.171
Accessibility to near local healer (in minutes)	.133	.058	5.243	1	.022**	1.142
Accessibility to public hospital (in min)	-.172	.039	19.116	1	.000***	.842
Frequency of availing medicine (per month)	-.522	.511	1.044	1	.307	.593
Frequency of check-up (per month)	.213	.370	.330	1	.566	1.237
No. of physical and communication infrastructures in the area	.318	.293	1.180	1	.277	1.375
No. of transportation means	1.225	.564	4.710	1	.030**	3.404
Membership to organization/ association	-.004	.370	.000	1	.992	.996
No. of institutional support received	-.296	.312	.901	1	.342	.743
Perception: How fast to evacuate/ response	.412	.638	.417	1	.518	1.510
Perception: Degree of impact of flooding	-1.238	.809	2.338	1	.126	.290
Perception: Reaction to flood incidence	-3.057	1.486	4.233	1	.040**	.047
Perception: Women during the flooding	3.005	1.181	6.476	1	.011**	20.193
Perception: Children during the flooding	-.303	.636	.228	1	.633	.738
Perception: Degree of damage	-.261	.466	.314	1	.576	.770
Perception: Loss of income	.386	.676	.327	1	.567	1.472
Perception: Preparation for flooding	-.506	.567	.797	1	.372	.603
Perception: Role of Brgy. Officials	-.529	.583	.823	1	.364	.589
Constant	6.663	4.799	1.928	1	.165	783.140

*Legend: *** significant at α=0.01; ** significant at α=0.05; *significant at α=0.10*

Based on the above model, the propensity score for each individual was generated. The classification of these individuals is further determined on the basis of their corresponding propensity scores obtained. The distribution of the propensity scores is shown in Figure 22 (Distribution of propensity scores for treated and untreated groups).

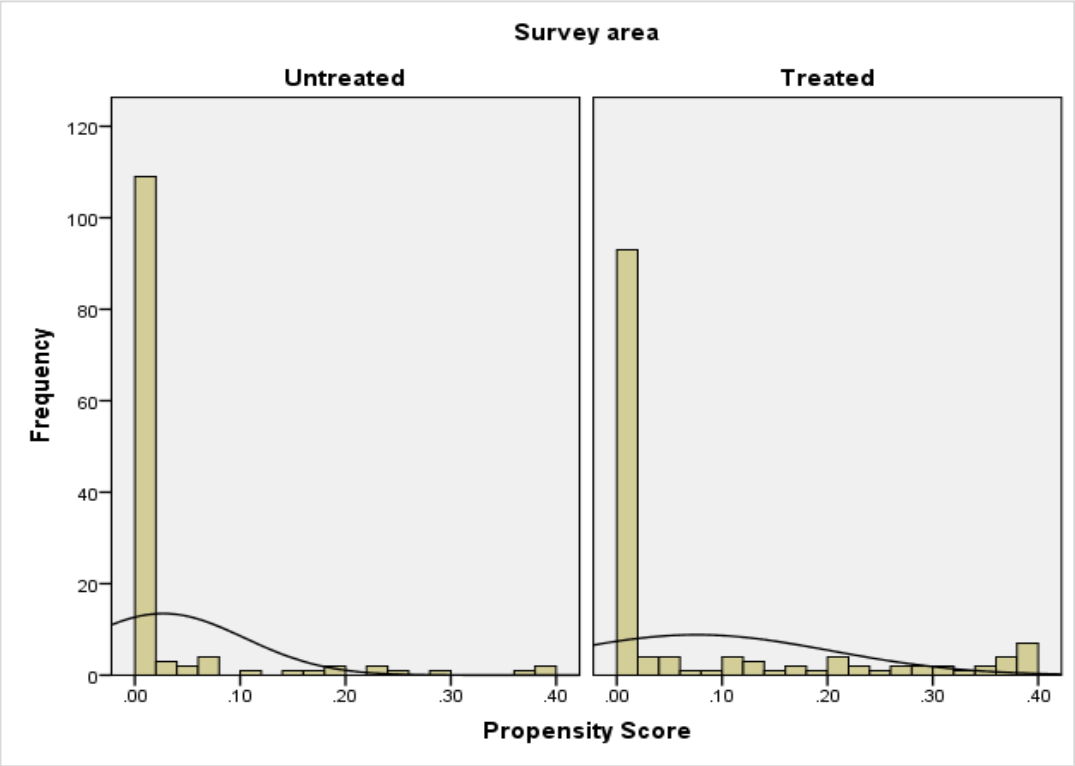


***Figure 22**. Distribution of propensity scores for treated and untreated groups*

Figure 22 shows the corresponding distribution of propensity scores for treated and for untreated groups. It can be observed that the pattern of the distribution of propensity scores is somewhat similar to both groups. Refer to Figure 23 to look closely whether these distributions have 'common support' region.

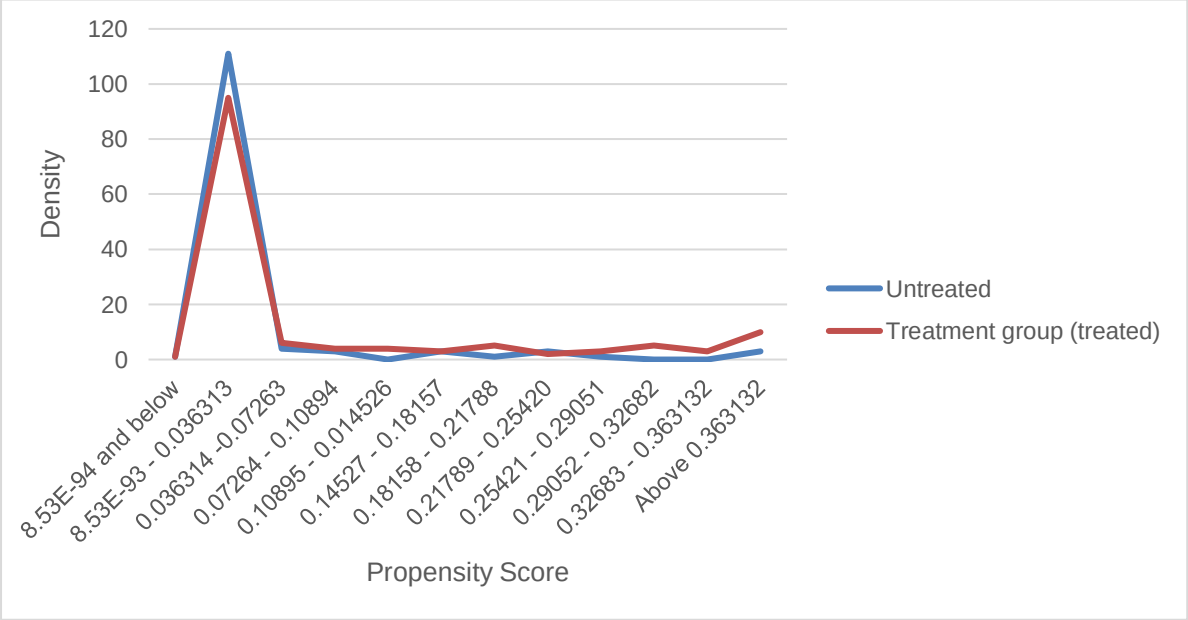


***Figure 23**. Distribution of propensity scores studying the common support*

As shown in Figure 23, the overlapping of distribution of individuals from treated and untreated groups is noticeable. The overlapping is said to be the region of 'common support', and where the treatment and comparison groups are matched. This further explains and shows that those respondents living in Brgy.

Mahay, Butuan City, and those who are in Brgy. Hawilian, Esperanza have statistically similar living condition and welfare before the time that LADP was implemented in Butuan City. The classification of those respondents under the comparison group is further strengthen by the results that overlapping covers almost the whole region of the distribution.

ii. Comparison of living condition of different groups before the implementation of LADP

To further show the equality of the two groups in terms of their living condition before there was a development project to combat the flooding in the areas, comparison of means tests were also conducted. Table B.2 shows the comparison test results of the condition between the treatment (Butuan City) and the comparison (Esperanza), groups before LADP implementation. As shown, there is no significant difference in the economic condition, health status, and social engagement of the households in Butuan City and Esperanza before LADP was established at α=0.05. This implies that these two groups are statistically equivalent in these aspects and have satisfied the requirement to undertake the impact assessment using the counterfactual approach.

Table B.2 *Comparison of the condition of different components in Butuan City (treatment group) and the Municipality of Esperanza (comparison group) before LADP implementation*

Null Hypothesis, Ho	Test Statistic[a]	p-value	Decision
There is NO significant difference in the economic condition of the community in Brgy. Mahay, Butuan City and Brgy. Hawilihan, Esperanza in 1980-1988 (before the implementation of LADP).	.890	.374	Fail to reject Ho at α=0.05
There is NO significant difference in the health status of the community in Brgy. Mahay, Butuan City and Brgy. Hawilihan, Esperanza in 1980-1988 (before the implementation of LADP).	-.643	.521	Fail to reject Ho at α=0.05
There is NO significant difference in the Social Engagement of the community in Brgy. Mahay, Butuan City and Brgy. Hawilihan, Esperanza in 1980-1988 (before the implementation of LADP).	.099	0.921	Fail to reject Ho at α=0.05

[a] *tested under Independent samples t-test*

iii. Over-all Welfare/ Condition of Different Groups before and after the implementation of LADP

The table below shows the over-all welfare/ condition from treatment and comparison groups through the scores and indices obtained.

Table B.3. *Index values/scores for each component per study group*

Area/ Group	Component	Scores		Difference
		Before (1980-1988)	After (2010-2018)	
Treatment Group: Brgy. Mahay, Butuan City	Economic	0.3148	0.5431	0.2282
	Health	0.7152	0.6980	-0.0171
	Physical and Communication Infrastructures	0.4731	0.5564	0.0833
	Social Engagement	0.1314	0.1998	0.0684
	Personal Experience and Perception	0.3793	0.8082	0.4194
	Impacts to Agriculture	0.2946	0.3752	0.0805
Over-all		**0.3847**	**0.5285**	**0.1438**
		Before (1980-1988)	**After (2010-2018)**	

Area/ Group	Component	Scores		Difference
		Before (1980-1988)	After (2010-2018)	
Comparison Group: Brgy. Hawilian, Esperanza	Economic	0.3323	0.3580	0.0257
	Health	0.7075	0.7125	0.0050
	Physical and Communication Infrastructures	0.3902	0.5171	0.1269
	Social Engagement	0.1331	0.2620	0.1289
	Personal Experience and Perception	0.3304	0.3693	0.0389
	Impacts to Agriculture	0.3728	0.3881	0.0153
Over-all		**0.3777**	**0.4345**	**0.0558**

iv. Counterfactual Impact Evaluation Results

Given in Table B.4 is the over-all welfare in every study group represented through index values. Using the Difference-in-Differences (DiD) estimation approach (comparison of means), the differences in the over-all welfare of the community in each study group are computed. In the table, the difference in the welfare of the treatment and comparison groups before the implementation of LADP equals to 0.0070. On one hand, the difference in the welfare of the treatment and comparison groups after implementing the project yields to 0.0940. Consequently, the net impact of LADP is calculated as 0.0870. This positive value implies a positive impact of the project to the community of Brgy. Mahay, Butuan City (treatment group).

Table B.4 *Over-all welfare/condition index value per study group*

Area/ Group	Over-all Welfare/ Condition Index Value, W		Difference
	Before (1980-1988)	After (2010-2018)	
Treatment Group: Brgy. Mahay, Butuan City	0.3847	0.5301	0.1454
Comparison Group: Brgy. Hawilian, Esperanza	0.3777	0.4345	0.0558
Difference	0.0070	0.0940	**0.0870**

Thus,

$$Net\ impact\ of\ LADP = (W_{T,After} - W_{C,After}) - (W_{T,Before} - W_{C,Before})$$
$$Net\ impact\ of\ LADP = (0.5301 - 0.4345) - (0.3847 - 0.3777)$$
$$Net\ impact\ of\ LADP = 0.0956 - 0.0072$$
$$\boldsymbol{Net\ impact\ of\ LADP = 0.0870}$$

Figure 25 shows the graphical representation of the net impact on the overall welfare or living condition of the population in the treatment group as a result of the intervention in blue line.

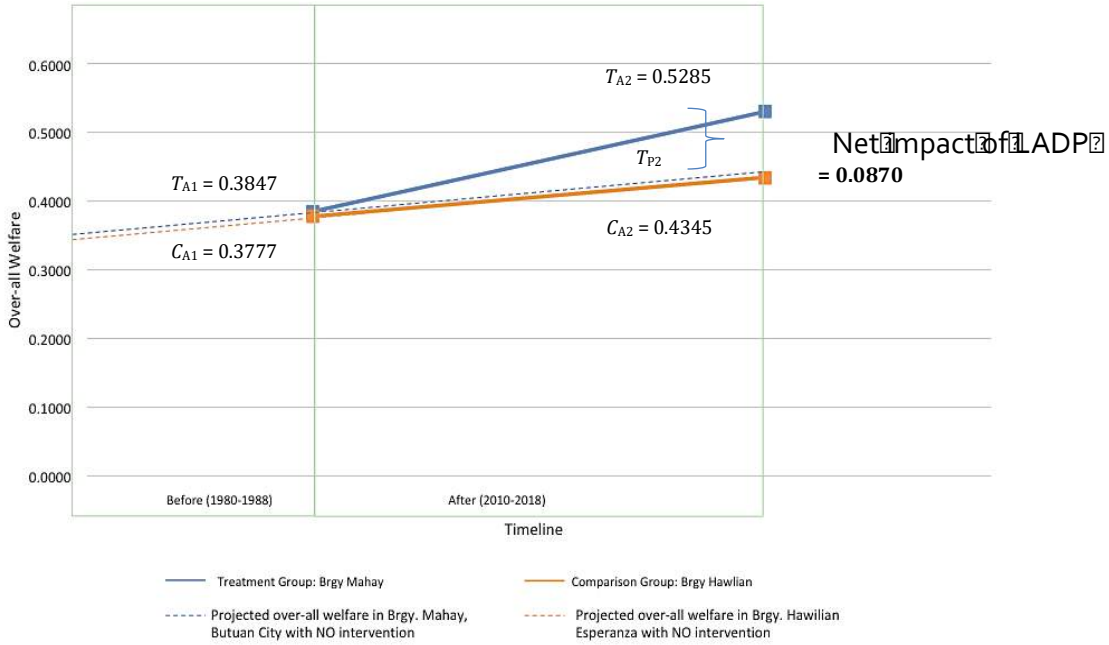


Figure 24. *Net impact of LADP using DiD estimation approach (Comparison of Means).*

v. Tests for Significant Difference in the Over-all Welfare of Two Groups before and after LADP implementation

After having obtained the condition of treatment and comparison groups with respect to different components using an index value, these groups were compared to determine whether there is a significant difference in these conditions/ welfare before and after LADP implementation.

a. Economic Condition

Table B.5 shows the comparison of economic condition in Brgy. Mahay, Butuan City before and after LADP implementation. The same analysis was also done in Brgy. Hawilian, Esperanza. As shown in Table B.5, indicators considered under this component are the household monthly income, house ownership, land ownership, and availability of financial and credit sources in the area. These indicators were standardized and aggregated to represent the over-all economic condition of the community.

Results show that there is a highly significant difference (significant at α=0.01) in the economic condition of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area. Moreover, the significant difference is due to the increase of the households' economic condition before (mean score = 0.3148) to its present state (mean score = 0.5431).

On the other hand, although the economic condition experienced by households in Brgy. Hawilian, Esperanza shows a significant difference (significant at α=0.05), however, the result gave a slight increase from the previous condition (mean score = 0. 3323) to the current (mean score = 0.3580).

Table B.5 *Comparison of economic condition in study areas before and after LADP implementation*

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the economic condition of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area.	Before: 0.3148 After: 0.5431	-15.940	.000	Reject Ho at α=0.01 (highly significant)

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the economic condition of the community in Brgy. Hawilian, Esperanza before (1980-1988) and at present.	Before: 0.3323 After: 0.3580	-2.182	.031	Reject Ho at α=0.05

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

Comparing the economic condition experienced by households from Butuan City (treatment group) and Esperanza (comparison group) gave a highly significant difference (significant at α=0.01) result. It can be seen that the economic condition in Brgy. Mahay, Butuan City is significantly higher than the latter with mean score 0.5431 after the LADP was implemented in the area.

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the economic condition of the community in Brgy. Mahay, Butuan City and Brgy. Hawilian, Esperanza after the implementation of LADP.	Treatment group: 0.5431 Comparison group: 0.3580	-11.139	.000	Reject Ho at α=0.01 (highly significant)

Legend: [a] mean score is a normalized value: [b] tested under independent samples t-test

b. Health Condition

Likewise, comparison of health condition in study areas before and after LADP implementation is shown in Table B.6. In this component, indicators to measure the over-all health condition in the area include the illnesses and/ or diseases experience, accessibility to health facilities and structures, and accessibility to health care and services. It can be noticed that there is a significant difference in the health condition of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area at α=0.05, however, the difference in the condition is relatively small (-0.0172). On the other hand, the health condition of the community in Brgy. Hawilian, Esperanza before (1980-1988) and at present (2010-2018) posed no significant difference at α=0.05.

On one hand, comparing the health condition of the community in Brgy. Mahay, Butuan City (treatment group) and Brgy. Hawilian in Ezperanza (comparison group) after the LADP implementation gave no significant difference at α=0.05. The result is shown in Table B.6. Thus, in terms of access to health services and facilities, and illnesses/ diseases experience during the current years (2010-2018), these two communities are relatively of the same condition.

***Table B.6**. Comparison of health condition in study areas before and after LADP implementation*

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the health condition of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area.	Before: 0.7152 After: 0.6980	1.990	.049	Reject Ho at α=0.05
There is NO significant difference in the health condition of the community in Brgy. Hawilian, Esperanza before (1980-1988) and at present.	Before: 0.7075 After: 0.7125	-.927	.356	Fail to reject Ho at α=0.05 (not significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the health condition of the community in Brgy. Mahay, Butuan City and Brgy. Hawilian, Esperanza after the implementation of LADP.	Treatment group: 0.6980 Comparison group: 0.7125	1.109	.268	Fail to reject Ho at α=0.05 (not significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

c. Physical and Communication Infrastructure

Comparison of physical and communication infrastructure in study areas before and after LADP implementation is shown in Table B.6. In the table, the physical and communication infrastructure in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area shows a significant difference at α=0.01 (highly significant). This change indicates a more improved infrastructure condition in the area as the index value at the current period (0.5564) is higher than before (0.4731). It was given in Table A.9 that under this component, indicators like presence of physical infrastructures (e.g roads, bridge, schools, churches, market, barangay hall, covered basketball court, community park, irrigation, water reservoir, multipurpose hall), presence of communication infrastructures (e.g. cellphone, radio, internet, landline), and availability of modes of transportation were considered. Likewise, in Brgy. Hawilian, there is a significant difference in the physical and communication infrastructure before (1980-1988) and at present (2010-2018) at α=0.01 (highly significant). The results also show that infrastructure in the area has developed through time.

On the other hand, there is a significant difference in the physical and communication infrastructure in Brgy. Mahay, Butuan City when compared to Brgy. Hawilian, Esperanza at α=0.05. This comparison was conducted considering the condition of these two areas after the implementation of LADP. Further, it can be observed that the physical and communication infrastructures in Brgy. Mahay are more developed than that in Brgy. Hawilian's as the index values are equal to 0.5564 and 0.5171, respectively.

Table B.6 *Comparison of physical and communication infrastructure in study areas before and after LADP implementation*

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the physical and communication infrastructure of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area.	Before: 0.4731 After: 0.5564	-6.721	.000	Reject Ho at α=0.01 (highly significant)
There is NO significant difference in the physical and communication infrastructure of the community in Brgy. Hawilian, Esperanza before (1980-1988) and at present.	Before: 0.3902 After: 0.5171	-8.089	.000	Reject Ho at α=0.01 (highly significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

Null Hypothesis, Ho	Mean[a]	Test Statistic	p-value	Decision
There is NO significant difference in the physical and communication infrastructure of the community in Brgy. Mahay, Butuan City and Brgy. Hawilian, Esperanza after the implementation of LADP.	Treatment group: 0.5564 Comparison group: 0.5171	-2.275	.024	Reject Ho at α=0.05

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

d. Social Engagement

Shown in Table B.7 is the comparison of social engagement of the community in study areas before and after LADP implementation. With social engagement, the study determines the membership of respondents to organization/ associations (e.g. religious, government, socio-civic, socio-political, microfinance, etc), and the availability of institutional support and programs coming from different organizations. Based on the results, there is a significant difference in the social engagement of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area at α=0.01 (highly significant. This further shows that availability of supports and programs, and affiliation of the community are more evident during the times when the Project was already put up. Likewise, social engagement of the community in Brgy. Hawilian, Esperanza before (1980-1988) and at present gave a significant difference result at α=0.01 (highly

significant). Affiliation of respondents to various organizations and availability of support from different institutions are more observable recently.

On the other, comparing the affiliation to organizations and availability of institutional supports by those communities living in Brgy. Mahay and Brgy. Hawilian gave a significant difference. Although both of these groups have improved significantly (as shown in Table B.7), but it is the community of Brgy. Hawilian has acknowledged more change in the area.

Table B.7. *Comparison of social engagement of the community in study areas before and after LADP implementation*

Null Hypothesis, Ho	Mean[a]	Test Statistic	p-value	Decision
There is NO significant difference in the social engagement of the community in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area.	Before: 0.1314 After: 0.1997	-6.865	.000	Reject Ho at α=0.01 (highly significant)
There is NO significant difference in the social engagement of the community in Brgy. Hawilian, Esperanza before (1980-1988) and at present.	Before: 0.1331 After: 0.2620	-10.310	.000	Reject Ho at α=0.01 (highly significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the social engagement of the community in Brgy. Mahay, Butuan City and Brgy. Hawilian, Esperanza after the implementation of LADP.	Treatment group: 0.1997 Comparison group: 0.2620	3.332	.001	Reject Ho at α=0.01 (highly significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

e. Personal Experience and Perception towards Flooding Incidence

Respondents were also asked about their experience on flooding incidence in the area. As shown in Table B.8, there is a significant difference in the experience and perception of the community towards flooding incidence in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area at α=0.01 (highly significant). It can be shown that flooding incidences have no longer affected the community in Brgy. Mahay after LADP was put up in the area. Unlike the situations before, the community were bound with fears and worries when flooding struck the area (*see Table 1 for the indicators under this component)*. On the other hand, although there is a significant difference in the experience and perception of the community towards flooding incidence in Brgy. Hawilian, Esperanza before (1980-1988) and at present (2010-2018), however, the change is relatively lower than that of in Brgy. Mahay. This change in Brgy. Hawilian is possible since there are already several programs and support coming from the LGU and other agencies in order to combat the flood impacts in the area.

Lastly, comparing the flood experience of the communities living in these two areas, it is the community of Brgy. Mahay gave a higher index value which implies a positive perception even if heavy rains happen in the area. The community perceived that flooding would no longer penetrate the area as LADP was implemented in the area.

Table B.8 *Comparison of personal experience and perception of the community towards flooding incidence in study areas before and after LADP implementation*

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the personal experience and perception of the community towards flooding	Before: 0.3798	-28.142	.000	Reject Ho at α=0.01

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
incidence in Brgy. Mahay, Butuan City before (1980-1988) and after (2010-2018) the implementation of LADP in the area.	After: 0.8082			(highly significant)
There is NO significant difference in the personal experience and perception of the community towards flooding incidence in Brgy. Hawilian, Esperanza before (1980-1988) and at present.	Before: 0.3304 After: 0.3693	-4.926	.000	Reject Ho at α=0.01 (highly significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

Null Hypothesis, Ho	Mean[a]	Test Statistic[b]	p-value	Decision
There is NO significant difference in the personal experience and perception of the community towards flooding incidence in Brgy. Mahay, Butuan City and Brgy. Hawilian, Esperanza after the implementation of LADP.	Treatment group: 0.8082 Comparison group: 0.3693	-28.640	.000	Reject Ho at α=0.01 (highly significant)

Legend: [a] mean score is a normalized value: [b] tested under paired samples t-test

IV. FINDINGS AND ANALYSIS

The presentation of the quantitative and qualitative analysis of the findings and data gathered follows the components of the Theory of Change which are the Inputs, Outputs, Outcomes and Impacts of the project.

A. INVENTORY OF STRUCTURES

This section presents the inventory of structures in the Detailed Design including additional implementations under FC-I, FC-II and Improvement of Urban Drainage System.

1. Extent of Floodwall Constructed

Geographically, the flood control project specifically the dikes & levees traversed 25 barangays on the East and West banks of Agusan River. Table 10 shows the list of barangays affected by FC-1 and FC-II.

***Table 10**. List of 28 Barangays traversed by LAPD dike and levees*

East Bank Barangays	West Bank Barangays	
Aupagan	Bit-os	Sikatuna
Tagabaca	San Vicente	Humabon
Mahay	Pangabugan	Leon Kilat
Buhangin	Maon	Ong Yiu
Baan Riverside	Golden Ribbon	Port Poyohon
Mahogany	Agao	Obrero
Banza	Rajah Soliman	Bading
Maug	Urduja	Agusan Pequeño
Baan Km 3	Silongan	Pagatpatan
	San Ignacio	

2. Total Stock of Flood Control Facilities

The post project evaluation (JICA, 2010) enumerated the planned and actual outputs of the Flood Control Project as presented in Table 11.

***Table 11**. Planned and Actual Project Output, FC-I and FC-II*

Project / Outputs	Plan	Actual	%
A. Flood Control - FC I			
1. Embankment Levee	12.3 km ; Height 4 m	10.3 km, Height 4 m	83.73
2. Concrete Floodwall	2.1 km; Height 4 m	5.4 km, Height 4 m	257.14
3. Dredging	900,000 m^3	700,000 m^3	77.78
4. Urban Drainage Sqs.	1,100 m	880 m	80.00
5. Floodgate	None	1 (addition)	
6. Spoil Bank Yard	171 has.	20 has.	11.70
B. Flood Control - FC II			
CP I – Agusan River Improvement			
a. Levee	14.5 km ; Height 4 m	12 km ; height 4 m	82.76
b. Structures	Spillway, 300 m; irrigation canal crossing, drainage sluices and siphon	Mahay sluice; Banza national sluice, Maug sluice, 8 RCPC cross drains	
c. Cut-off Channel	5.7 km.	5.5 kms.	96.49
d. Cut-off Channel Maintenance Road	1.2 km.	Cancelled	
e. Dike	7.3 kms.	Cancelled	
f. Dredging	3000,000 m^3	693,375 m^3	231.16
g. Tumampi Bridge	Pedestrian Bridge	Vehicle bridge, 3 spans, 48 m. in length	
CP II – Construction of Magsaysay Viaduct			
a. Cost of Viaduct	628 m.	628 m.	100
b. Cut-off Channel Bridge	90 m.	90 m.	100

Project / Outputs		Plan	Actual	%
c.	Approach Road	135 m.	135 m.	100
CP III – Banza River Improvement				
a.	Dike (Left Bank)	6.2 km.	Deleted	55.57
b.	Dredging	1,212,000 m^3	2,180,905 m^3	52.94
c.	Spoil Bunk Yard	170 has.	90 has.	26.10
d.	Land Improvement	30 has. out of the spoil bunk yard; provision of water, electricity, roads and drainage facilities, construction of 415 housing	7.83 has. was purchased and developed, provision of water, electricity, roads and drainage facilities, construction of 415 housing	26.10
e.	East Bank Drainage	15.3 kms.	Deleted	-
f.	Floodwall		Banza Pedestrian Bridge 72 m (added)	
CP IV – Masao River & Urban Drainage System Improvement				
a.	Masao River Improvement	Levee 11.7 km; Excavation 193,000 m^3 Dredging, 185,000 m^3	Levee was cancelled, Excavation 408,700 m^3 Dredging 408,700 m^3	0 211.76 220.91
b.	Improvement of Urban Drainage System	Total 30 km in 6 areas	a). Urban Creek Improvements. Total 19.1 km, 7 areas including Sosompit Drainage Channel : Total 1.4 km added	-
			b). Drainage Channel Sluices and Culverts	

Completed projects under FC-I were evaluated based on the description in the JICA study through actual measurement and observational methods in relation to its intended function. The status of each project is shown in Table 12. The dredging project output of 700,000m^3 could not be determined, however LADP PMO reported that the dredging was conducted at the mouth of Agusan river.

The visual inspection of the Masao River improvement project was done using a remotely-operated unmanned aerial vehicle or a drone equipped with a high resolution camera. The aerial inspection revealed that the whole stretch of Masao River from Libertad to its mouth at Brgy. Masao has well defined banks with thriving nipa and mangrove trees. The section near the mouth of the river, see Figure 26, has been used as a fish cage farm area for bangus.

The flood control structures and facilities that were turned-over by DPWH to the local government unit of Butuan in 2007 were inspected and geotagged. Table 23 shows the status of the geotagging activity of the structure, the date it was geotagged and the findings or status of the structure or facility.

Figure 25. *Section of the improved Masao River. Drone photo, 2018.*

The structures and facilities turned-over by DPWH to LGU Butuan as listed in the Amended MOA and the 2010 JICA Ex-post Report were the basis for the inventory of LADP outputs. Aside from photographs, the structures were Geotagged to enrich the research database of the study and for future reference. Table 19 is a list of structures inspected and Geotagged.

Table 12. *Geotagged Structures and Facilities turned-over by DPWH to LGU Butuan.*

LADP Stage 1, Phase 2	Specifications	Status of Geotagging Activity	Date Geotagged	Status of Project Facilities
I. East Bank Flood Control Facilities				
1. East Bank Levee	12.1 km	Completed	4/26/18	Functional
2. Cut-off Channel	6.2 km	Completed	10/23/18	Functional
3. Maug Creek Drainage Sluice	2.5 m. (W)x 3.0 m (H) x 1 lane	Completed	4/26/18	Functional
4. Mahay Creek Drainage Sluice	2.5 m. (W)x 3.0 m (H) x 1 lane	Completed	4/26/18	Functional
5. Banza River Navigation Sluice	5.0 m (W) x 5.5 m (H) x 2 lanes	Completed	4/26/18	Functional
6. Tumampi Vehicular Bridge	4.5 m (W) x (15 m+18m+15m) span	Completed	4/27/18	Functional
7. Improvement of Banza River	6.2 km	Completed	4/27/18	Functional
8. Banza Pedestrian Bridge	2.15 m (W) x 18.0 m (L) x 4	Completed	4/27/18	Functional
9. Initial Resettlement Area (IRA)	415 housing units on a 7.8 ha.	Completed	10/20/18	Functional
II. Masao River Improvement And Construction Of Urban Drainage System In Butuan City (West Bank)				
A. Improvement of Masao River				
1. Channel Length	5.45 km	Completed	10/29/18	Functional
B. Improvement Of Urban Drainage System (Butuan City)				
1. T. Calo-Suatan-Masao Channel	6.2 km.	Completed	5/4/18	Functional
2. Doongan Creek	1.4 km.	Completed	5/4/18	Functional
3. Mandacpan-Bonbon Channel	3.7 km.	Completed	6/25/18	Functional
4. Libertad-Masao River	2.9 km.	Completed	5/4/18	Functional
5. Sosompit Creek	1.4 km	Completed	5/4/18	Functional
6. Middle Reach (Mandacpan-Libertad Bridge)	3.2 km.	Completed	5/4/18	Functional

C. Sluices	Findings	Sluices	Findings
1. T Calo-Suatan-Masao River			
a) Lower T. Calo		c). Upper T. Calo	
a.1) STCM1-R1 @ TCM 2+225.00 (Type "E")	Missing	c.1) STCMU-R1 @ TCM 4+575.25 (Type "A")	Missing
a.2) STCM1-R2 @ TCM 1+920.00 (Type "C")	Missing	c.2) STCMU-R2 @ TCM 4+870.32 (Type "A")	Missing
a.3) STCM1-R3 @ TCM 1+710.00 (Type "C")	Missing	c.3) STCMU-R3 @ TCM 4+250.00 (Type "D")	Missing
a.4) STCM1-L1 @ TCM 1+331.00 (Type "A")	Missing	c.4) STCMU-R4 @ TCM 5+870.00 (Type "A")	Missing
a.5) STCM1-L2 @ TCM 2+010.00 (Type "C")	Missing	c.5) STCMU-R5 @ TCM 5+043.00 (Type "A")	Missing
a.6) STCM1-L3 @ TCM 2+195.00 (Type "E")	Missing	c.6) STCMU-L1 @ TCM 4+446.57 (Type "A")	Missing
a.7) STCM1-L4 @ TCM 0+848.00 (Type "C")	Missing	c.7) STCMU-L2 @ TCM 4+943.08 (Type "A")	Missing
a.8) STCM1-L5 @ TCM 1+848.00 (Type "C")	Missing	c.8) STCMU-L3 @ TCM 5+039.39 (Type "E")	Missing
a.9) STCM1-L6 @ TCM 0+435.00 (Type "E")	Missing	c.9) STCMU-L4 @ TCM 5+358.10 (Type "C")	Missing
b) Middle T. Calo			
b.1) STCMm-L1 @ TCM 3+200.00 (Type "C")	Missing	c.10) STCMU-L5 @ TCM 5+742.61 (Type "A")	Missing
b.2) STCMm-L2 @ TCM 3+856.00 (Type "D")	Missing	c.11) STMCU-L6 @ TCM 5+997.00 (Type "D")	Missing
b.3) STCMm-L3 @ TCM 3+450.00 (Type "C")	Missing		
b.4) STCMm-R1 @ TCM 2+970.43 (Type "D")	Missing		
b.5) STCMm-R2@ TCM 3+827.37 (Type "D")	Missing		
b.6) STCMm-R3 @ TCM 3+505.00 (Type "A")	Missing		

C.	Sluices	Findings	Sluices	Findings
	2. Doongan Creek			
	2.1) SDC-R1 @ DC 0+428.28 (Type "E")	Missing	2.5) SDC-L1 @ DC 0+084.45 (Type "E")	Missing
	2.2) SDC-R2 @ DC 0+135.10 (Type "E")	Missing	2.6) SDC-L2 @ DC 0+739.65 (Type "C")	Missing
	2.3) SDC-R3 @ DC 0+150.00 (Type "C")	Missing		
	2.4) SDC-R4 @ DC 0+665.50 (Type "C")	Missing		
	3. Suatan Sluice Gate			
	3.1) Suatan Sluice Gate	Missing		

D.	Road Crossing Box Culvert			
	1. T. Calo-Suatan-Masao River		2. Doongan Creek	
	a) Lower T. Calo		2.1) BC-DC1	Functional
	a.1) BC-TCM2	Functional	2.2) BC-DC2	Functional
	b) Middle T. Calo			
	b.1) BC-TCM3	Functional	3. Langihan Creek	
	c) Upper T. Calo		3.1) BC-LC1	Functional
	c.1) BC-TCM4	Functional	4. Sosompit Creek	
	c.2) BC-TCM5	Functional	4.1) BS-SC1	Functional
	c.3) BC-TCM6	Functional		

E.	Lateral Drainage Pipe	
	1. Sosompit Creek	
	1.a) SC-LDP @ 1+000	Functional
	1.b) SC-LDP @ 0+850	Functional
	1.c) SC-LDP @ 0+697.63	Functional
	1.d) SC-LDP @ 0+500	Functional
	1.e) SC-LDP @ 0+250	Functional

F.	Road Pipe Culverts	
	1. Upper T. Calo-Suatan-Masao River	
	a) RPC-TCM 5+973	Functional
	2. Doongan Creek	
	a) RPC-DC 0+080	Functional

An important feature of the LADP urban drainage channels were the installation of steel sluice gates. A total of 33 units were installed at strategic points. A sluice gate is a mechanism used to control the flow of water. LADP installed the mechanically controlled vertical sliding sluice gates to control sea water intrusion into the protected area at high tide and monsoon season where the gates are shut. These gates are designed to be kept open to drain run-off rainwater from the protected area into the LADP drainage channel.

It was found that all 33 sluice gates were missing as listed in Table 12, section (c) as result of theft and vandalism. A discussion on the topic is on page 70 on the section titled “Missing Urban Drainage Sluice Gates”.

The nine (9) Road Crossing Box Culverts were functional; The RC Box Culverts allow water of the drainage canals to flow freely under a road. The Road Pipe Culverts installed towards two waterways are functional and the five (5) Lateral Drainage Pipes along Sosompit Creek are also functional.

***Table 13**. Geotagging of West Bank Floodwall and Levees*

Structure	Geotag Status	Date Geotagged	Status of Project
West Bank Levee – Upper West Bank Levee (Bit-os to Pangabugan) – Lower West Bank Levee (Agusan Pequeño to Pagatpatan) Total length 10.3 km; Height 4 m	Complete	4/28/18	Functional
West Bank Concrete Floodwall – (Pangabugan to Agusan Pequeño) 5.4 km; Height 4 m	Complete	4/28/18	Functional

3. Resettlement Areas

In 1996, eight years after the start of FC-I, LADP acquired lands for the resettlement. Under Phase-1, 51 hectares of land was developed in Brgy Pagatpatan where 785 were relocated in lots at 80 sq.m. each. In Phase-2, 415 housing units with facilities were established in a 7.8 hectare area in Baan Km 3 where 415 HH were relocated in home lots measuring 120 sq.m./lot. Another 287 HH were transferred to Brgy Mahay in lots at 96 sq.m./lot in size.

In 2002-2003, after the completion of FC-I, an Inter-Agency Resettlement Task Force (CHDO-NHA-DPWH CARBDP PMO) conducted a census in the floodway to determine the remaining number of families that still needs to be relocated. The Task Force "tagged" or affixed a sticker on the houses of the families that were considered for relocation. The CHDO however, could not provide the summary of the "tagging" activity.

In the ex-post evaluation, 4,015 HH were planned to be relocated but only 1,477 HH were actually resettled. After the flood occurrence in 1999, the inventory rose to 5,901 HH including those who are indirectly affected by the project. There were 3,509 HH coming from the east bank and 2,392 HH from the west bank.

***Figure 26**. Section of Brgy. Pagatpatan Resettlement Site. Drone photo, 2018.*

CARBDP acquired a total of 72 lots with an aggregate area of 143.63 hectares, but only 108.85 hectares were transferred to LGU-Butuan as the lots were untitled and suffer from technical deficiencies.

Table 14. *Location and Description of Occupied Resettlement Sites*

Site	Area (m^2)	Status
Brgy. Baan Km 3 (IRA)	78,315	Fully occupied
Brgy. Aupagan	20,000	Sparsely occupied
Brgy Taguibo	61,264	Partially occupied
Brgy. Cabcabon	120,000	Partially occupied
Brgy. Tiniwisan	49,999	Occupied
Brgy. Mahay	94,326	Almost Fully Occupied
Brgy. Tagabaca	18,556	Sparsely occupied
Brgy. Baan Riverside	32,898	Occupied
Brgy. Pagatpatan	336,851	Almost Fully Occupied
Brgy. Agusan Pequeño	145,719	Occupied
Brgy. Babag	29,161	Occupied

The City of Butuan, in its effort to address the resettlement issues provided budget for site development and assigned the City Housing and Development Office as a focal unit for resettlement concerns.

As of 2018, City Housing and Development Office reported that the LGU has partially developed 13 sites (6 with funding, 7 needs funding) with a total land area of 116.64 hectares subdivided into 3,674 lots in varying areas of 80, 96 and 120 sq.m. per lot. Out of these lots, 2,606 were already awarded and 1,068 were unoccupied. Accordingly, documentary requirements of applicants are currently processed under directives of the new local chief executive.

CHDO further reported that the LGU invested P14,134,198.59 for the development of two ORAs, P554,550.64 in Aupagan and P113,579,647.95 in Baan Km 3 as shown in Table 15 - Status of LADP Resettlement Areas.

The National Housing Authority, on the other hand, funded 4 sites (BCNV 3A in Baan Km 3, BCNV 2 in Mahay, BCNV 4A in Taguibo, and in Pagatpatan) in the amount of P 92,085,236.00 through a MOA with the LGU. Five other sites BCNV 3A in Baan Km 3, ORA Cabcabon, ORA Tagabaca, ORA Tiniwisan and BCNV 4B in Taguibo.

The LGU has no estimate of the development cost for the entire resettlement sites which could have helped in determining the cost per relocatee. The LGU developed the areas progressively due to funding constraints. The CHDO revealed that the LGU is open for partnerships and funding initiatives for the development of the other sites. The MOA between the LGU with NHA requires 50% of the project cost to be repaid by the LGU which the LGU passed on to the relocatees as monthly amortization.

It was found that there are families who resettled in some vacated houses and some are renting the houses previously awarded to project-affected families who once moved to the resettlement areas but eventually left. Others returned to the floodway because the monthly amortizations for the houses in the resettlement areas are a financial burden for them. The exact number of new settlers was not determined but residents confirmed the first wave of original resettled families is now less than that of the total number of present settlers.

4. DPWH Status of Foreign Assisted Projects

The LADP PMO provided a document titled “DPWH Status of Foreign Assisted Projects Report” (as of June 30, 2017) attached as Annex 5. The document is an Audit Observation Memo referred to as DPWH-OSEC-F10-2017 (16) that shows a summary of the different construction packages, major project components, names of contractors, dates and costs, like:

1. Loan Effectivity Date
2. Loan Closing Date
3. Approved Original Lots
4. Revised Project Costs
5. Date Started
6. Original Completion Date
7. Revised Completion Date
8. Project Status
    - 8.a. Percentage of completions
    - 8.b. Total Cost Disbursed

The said document provided the Consultant of a snapshot of the major activities and costs of the LADP from 1997 up to 2010.

Table 15. *Status of LADP Resettlement Areas*

Name of Resettlement	Location	Total Land Area (sq.m.)	No. of Lots	HH Lot Area (sq.m.)	Awarded Lots	No. of Vacant Lots	Remarks	Development Cost
1. Overall Resettlement Area (ORA) Aupagan	Aupagan	20,000	114	120	75	39	Partial Land Dev't. implemented by LGU-Butuan; with Deed of Conveyance but parcel of land not yet transferred from DPWH-RP to LGU-Butuan; Lots partially awarded	554,550.64 (LGU-Butuan)
2. Initial Resettlement Area (IRA)	Baan Km3	78,315	419	120	411	8	House & Lot Dev't. completed; Land titles already in the name of LGU-Butuan; Lots partially awarded	c/o DPWH-CARBDP
3. Overall Resettlement Area (ORA) B1-B8	Baan km 3	106,210	566	96	536	30	Partial Land Dev't. implemented by LGU-Butuan; certain parcels of land not yet transferred from DPWH-RP to LGU-Butuan; Lots partially awarded	13,579,647.95 (LGU-Butuan)
4. Butuan City New Villages 3A (BCNV 3A)	Baan km 3	37,730	299	80	16	283	On-going Land Dev't., MOA w/ NHA; Land titles already in the name of LGU-Butuan; Lots partially awarded	23,052,023.65 (NHA)
5. Butuan City New Villages 3B	Baan km.3	43,110	300	80	-	300	For MOA w/ NHA (2019); budget allocation from NHA already approved; Land titles already in the name of LGU-Butuan	-
6. ORA Cabcabon	Cabcabon	120,000	-	-	-	-	For MOA w/ NHA / other NGA's; Land titles already in the name of LGU-Butuan	-
7. ORA Mahogany	Baan Riverside	32,898	139	120	-	139	With actual occupants; Parcel of land not yet turn-over from DPWH-RP to LGU-Butuan	-
8. BCNV 2	Mahay	94,326	294	96	131	163	Land Dev't Completed implemented by NHA; Land title already in the name of LGU-Butuan; Lots partially awarded	36,542,425.71 (NHA)
9. ORA Tagabaca	Tagabaca	10,775	-	-	-	-	For MOA w/ NHA / other NGA's; Land title already in the name of LGU-Butuan	-
10. ORA Tiniwisan	Tiniwisan	49,999	-	-	-	-	For MOA w/ NHA / other NGA's; Land titles already in the name of LGU-Butuan	-
11. ORA Taguibo now Butuan City New Villages 4A	Taguibo	47,840	301	80	287	14	Land Dev't. partially completed; Land titles already in the name of LGU-Butuan; Lots partially awarded	22,900,524.25 (NHA)
12. BCNV 4B	Taguibo	13,420	111	80	111	0	For MOA w/ NHA; Land titles already in the name of LGU-Butuan; lots awarded	-
13. Pagatpatan	Pagatpatan	511,731	1,131	80	1,039	92	Partially developed w/ NHA and LGU-Butuan; Land titles already in the name of LGU-Butuan; Lots partially awarded	9,590,262.40 (NHA-Partial Dev't.)
	TOTAL	**1,166,354**	**3,674**		**2,606**	**1,068**		

Source: City Housing and Development Office, as of December 2018

B. PROJECT BENEFITS AND GAINS

1. Number of Households Benefitting from the Flood Control System

The total barangays directly benefitting from the flood control structures and urban drainage system is 46 with a total population 220,222 as of 2015. Estimated number of HH is 52,811, living in an area of 294.72 km^2, or a total population density of 774 persons/km^2. Computed at the projected area of 2,661.00 hectares for residential purposes in the city's comprehensive land use plan (1997-2010), the population density today is within 8,279 persons per square kilometer.

The flood control structures, composed of the levee and concrete flood wall, directly benefitted 28 barangays with a total population of 113,741 with estimated household of 27,276, with the west side sharing 68,580 population (16,446 HH). The eastern side has 18 barangays, with 45,161 population (10,830 HH).

With reference to classification of residents as being inside and outside the floodway, the estimated population within the floodway is 24,131 which is equivalent to 5,786 households. This is collaborated by the data from ANECO which indicated that it had 5,656 connected customers within CARBDP-LADP floodway including 5,429 residential houses. In the field survey three (3) HH out of 384 sampled within the floodway have no electric connections.

The influence area of the Urban Drainage Systems are 19 barangays with a total population of 106,481 individuals in 25,535 households.

***Table 16**. HH benefitting from the Flood Control and Improvement of Urban Drainage*

Project	Total Population per 2015 Census Data of affected barangay		No. of Households	Average No. / HH of the study	Remarks
	West	East			
1. Flood Control Structures	68,580*	45,161*	27,276	4.17	Barangay population (2015 census)
	113,741				
2. Urban Drainage System	106,481		25,535	4.17	-
Total	220,222		52,811	4.17	

Source: *PSA 2015 Census of Population

The total population directly benefitting from the flood control and urban drainage systems represent 66% of Butuan City's population in 2015.

2. Flood Disturbance

The intended benefits and gains of the project are the continuing economic development activities without interruption and disruption due to widespread flooding. Table 17 shows the detailed flood data from 1999-2009 indicating less interruption and disruption of flooding incidence. The most affected were those who continue to stay within the floodway.

The survey revealed that 47.17% of the respondents (those living within the floodway) have evacuated due to flooding of Agusan River. From this number, 98.34% voluntarily evacuated with majority (79.56%) needing assistance. Asked if they liked the evacuation area, 71.27% said in the affirmative, and 71.82% of them were satisfied by the relief goods they received.

During flood disturbances, the respondents confirmed that 32.04% of their children were absent from school due to safety and health reasons and at some extent their school rooms were used by evacuees.

Problems on potable water affected 83.43% of the evacuees and 83.98% suffered lack of electricity.

Evacuation brought stress to 90.61% usually due to worries of their properties left in the houses, consequent damages to be repaired and the uncomfortable surroundings. Effects on family relationship, is however low at 2.76%. Quarrels among family members are only 1%.

FGD participants reminisced that in 1962, evacuation was experienced every year, usually during November - January. Flood usually reaches the second floor of their houses. After the floodwall was installed, they also said that flooding experienced by the lower barangays along Agusan River was mitigated by the floodwall and levees added by CARBDP towards Pagatpatan. They attributed the present flooding to the drainage system, not from Agusan River.

Small-scale illegal mining activities in the upper barangays of De Oro and Basag in the western side have caused heavy siltation of the rivers and creeks in Barangay Lemon leading towards Barangay Mahay. The sidements and debris eventually settled in the rice fields in Barangay Mahay and Tagabaca, reducing yields down to 40% to zero from the usual harvest volume before the project. The East Bank cut–off channel, which was supposed to collect the rainwater in the area has not actually reached the intended area. This cut-off channel has become shallow due to silt, mud, and mine wastes. No dredging was undertaken. Despite this situation, the residents and farmers at Barangay Mahay considered the earthen levee to have contributed to the uplifting their lives in general, as flood protection and access road. They recommended that the earth levee should be riprapped to prevent scouring, erosion and damage by floodwaters which occurred in 2014.

In the upstream section of the east bank, particularly at Brgy. Aupagan, illegal quarrying and mining activities threaten the integrity of the area which is a natural retarding basin of the Agusan River. The area naturally controls floodwater by slowing down the force and volume of floodwater before entering the floodway and into Butuan Bay.

In Barangay Mahogany, a plywood manufacturing plant, which existed before the FCS, is now inside the floodway. The manufacturing plant has attracted a sizeable population in the area as long-time residents and transients workers. They have coped with the flooding situation whenever it occurs. The most recent was TD Agaton in 2014 where they evacuated from their houses and took refuge on top of the road dike (levee) when Agusan River swelled. Floodwater rose between 7 and 8 feet on the streets inside the floodway. As adaptation, most of their houses are built on concrete stilts 8 to 10 ft above the ground to allow floodwater to pass under their houses. They reported that the current in the recent flood is much stronger compared to the time when the levee was not built. This could be due to the concentration of the volume of river water has been confined within the floodway where their houses were situated.

Results of household survey, FGDs and KIIs indicated the following:

- The key informants confirmed that the government has acted to mitigate flooding as early as 1963 after the great inundations experienced in 1962 and 1963. The local government of Butuan City at that time constructed a 6-km rubble concrete wall at the western approach of Magsaysay Bridge, 1.2 to 1.8 meters high, barely enough to protect the urban center from the yearly recurring floods. Due to fund constraint however, flood control construction was suspended.

- When funds became available on December 1974, flood control efforts focused in hastening the discharge of stagnated floodwaters in the Libertad-Masao-Ambago area by excavating a network of drainage channels with an accumulated length of 35 kms at 6-8 meters wide and 2 meters deep across the swamplands located in the west bank of Agusan River, and connect the drainage channels to the existing rivers, Masao and Agusan Pequeño into Butuan Bay. The draining resulted in the reclamation of about 5,000 hectares of marshland that was later developed and converted to agricultural lands, residential, commercial lots and institutional areas.

- The channel excavations at Libertad unearthed several important archaeological artefacts including the now famous “Balanghai” boats. The discovery started the claim that the boat fits the description made by the Venetian Chronicler Antonio Pigafetta during Magellan’s visit to the area. The excavation site has led to the birth of the Butuan National Museum.

- The yearly flooding experienced by the residents made them resilient as they cope with the menace. CARBDP was created in 1978 to mitigate flooding in Butuan City from Agusan River through the LADP.

- Houses along and near the river bank were constructed to adapt to the floods where 84.6% are 1-storey houses, and 14.3% are 2-storey houses. Around 67.7% of these houses have no emergency exits.

- As to the house foundation, 55.5% of the respondents said they did not consider constructing their houses to withstand high floodwaters and strong currents. There were 37% who constructed their houses with the purpose of withstanding floods.

- On preparations for evacuation, 58.67% of the respondents within the floodway did not have a place in their house to serve staging area or assembly point for evacuation while 35% have identified a section of the house to prepare for evacuation.

- Most of the residents (62%) think that they have benefitted from the dike/levee by confining the flood from Agusan River, 33% used the levees as access road, 10% have used it as evacuation site during floods. However, about 9% said they derived no benefit from the project.

- A large portion of residents (89%) also believed that the flood would remain to affect them if the dike/levee were not constructed at all.

Table 17. Flood Data of Butuan City from 1999 to 2009

No	Date of Occurrence	Type of Disaster	Maximum Flow (m^3/Sec.)	Annual Highest Water Level (m)	No. of Affected Barangays*	Affected Population*		Damaged Houses	Casualties	Total Cost of Damages (000 peso)		
						Families	Persons			Agriculture	Infrastructure	Total
1	1999 Feb	Flashflood due to La Nina	4,500	3.97	86	57,451	288,477	0	14	53,130	79,540	114,670
2	2000 Feb	Flashflood	2,200	2.6	26	11,464	54,464	0	0	686	25,300	25,986
3	2001 Feb	Flood due to continuous heavy rains	1,500	1.96	15	3,780	17,875	0	0	4,355	8,000	12,355
4	2001 Dec-2002 Jan	Flashflood due to continuous heavy rains	1,600	2	50	12,064	54,453	7,425	0	33,820	29,240	63,060
5	2003 Oct	Flashflood due to Continuous heavy rains	200	0.69	41	17,511	72,473	20	0	457	10	467
6	2004 Feb	n.a	1,200	1.64	29	11,668	51,555	4	0	1,170	0	1,170
7	2006 Feb	Flooding due to Monsoon rains	3,300	3.2	31	13,250	68,347	0	5	17,016	50,960	67,976
8	2007 Jan	Flooding due to Monsoon rains	2,000	2.34	22	8,218	34,759	0	0	0	0	0
9	2009 Jan	Continuous heavy rains due to the tail-end of a cold front	1,500	1.95	2	n.a.	n.a.	0	0	0	0	0
10	2009 Nov	Continuous heavy rains for five (5) days	1,500	1.95	8	2,649	13,495	14	0	0	0	0

Source: JICA 2010 Ex-post Evaluation Report

3. Flood-related mortality

Since the project turnover in 2007, flood-related mortality was recorded in 2009 and 2014 with 14 and 4 casualties, respectively.

The HH survey revealed that evacuations and resiliency have significantly reduced mortality in the recent floods. The same survey showed that 2.3% of the respondents claimed they knew someone who died in the neighborhood. It was not clear however, if they are referring to the same casualty considering the close proximity of the sampled population.

4. Flood-related agricultural losses

Although agriculture production and the development of productive areas are the purview under the Irrigation Component of LADP, flood-related losses in agricultural areas within the protected area on the east bank have been recorded at Brgy. Mahay and Tagabaca. Farmers reported that the floodwater that inflicted damage and losses on their ricefields did not come from the Agusan River but was caused by the runoff water that has collected in the area as a result of being blocked by the east levee running parallel with the Agusan River. These runoff water used to freely flow into the Agusan River unimpeded. Farmers reported that silt, sand and debris transported by floodwater has covered and overfilled the irrigation canals rendering their fields unfit for rice farming.

The study found that the east bank cut-off channel has failed to reach the creeks that it was supposed to drain into Butuan Bay during heavy rains independent of the Agusan River Floodway. LADP PMO said that a right of way problem prevented the east bank cut-off channel to reach that critical area which is 1.5 kilometers away from its present upstream starting point. The farmers were saved from floodwaters coming from Agusan River but not from flooding caused by heavy local rainfall.

In a report from DA-BAS, rice farmers at Brgy. Mahay, and Tagabaca suffered agricultural losses in 2014 due to TD Agaton as shown in Table 30, below.

***Table 18**. Agriculture (Rice) Damage at FCC Target Areas*

Barangay	Total Potential Area	Standing Crops	Total Affected Area	Percentage (3/2)	Total Cost (P)	Average Cost / ha
1. Ambago	40	15	8	53.33	100,000	12,500
2. Ampayon	500	308	50	16.23	625,000	12,500
3. Baan km. 3	430	91	50	54.94	625,000	12,500
4. Banza	150	50	50	100	375,000	7,500
5. Basag	458	79	25	32	312,500	12,500
6. Bayanihan	40	12	12	100	90,000	7,500
7. Bit-os	150	30	23	76.66	287,500	12,500
8. Bayanihan	48	48	38	79.16	475,000	12,500
9. Doongan	50	20	12	60	150,000	12,500
10. Libertad	385	130	91	70	1,137,500	12,500
11. Mahay	260	124	75	60.48	937,500	12,500
12. Maug	53	28	25	89.28	87,500	3,500
13. Tagabaca	750	490	100	20.4	1,250,000	12,500
14. Villa Kananga	61	25	15	60	187,000	12,500
15. Mahogany	32	32	30	93.75	225,000	7,500
TOTAL	3,407	1,482	604	40.75	6,864,000	11,364
Butuan City Situation	11,107	4,675	2,898	61.98	32,894,125	11,351

Source: DA-BAS

5. Flood-related business losses

There is a need to establish information/data on the losses to business due to flooding. However, disruption of business operations can be gleaned from the damage to infrastructure due to flooding from 1999-2009 (JICA 2010). Figure 27 shows that there were lesser damage to infrastructure for the period. No official data on business losses attributed to flooding in the 2010-2017 period, however

KII data gathered that a businessman whose ice cream factory is located inside the floodway reported losing P100,000.00 worth of flour due to floods brought by TD Agaton in 2014.

In terms of business operations, the HH survey shows that 57.14% said they incurred no revenue losses in the last flood, while 30% claimed they incurred around Php 5,000.00 and below, a few (2.8%) incurred losses of up to Php 40,000.00.

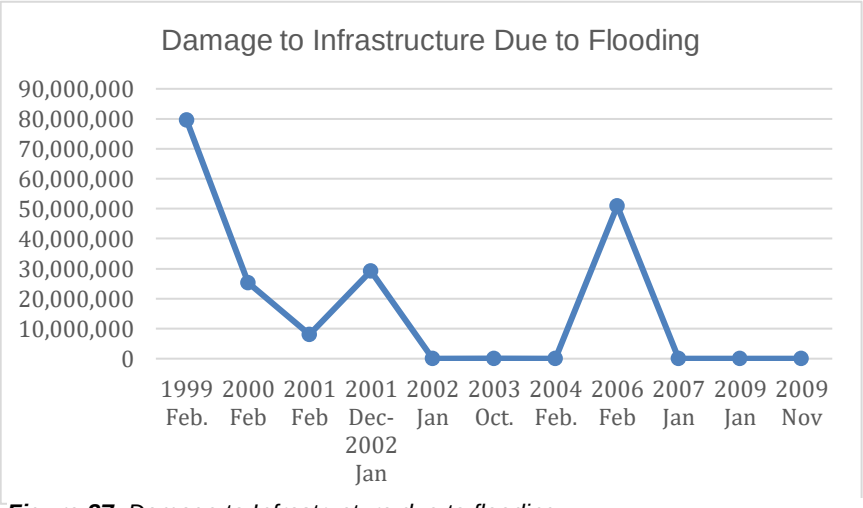


Figure 27. *Damage to Infrastructure due to flooding.*

The total number of businesses registered in 2013 was 9,619 (an increase of 9.86% which is about 3 times that of the next major city in the Region). New businesses registered reached 2,032 with a combined capitalization of P504,598,667, an expansion of 75.63% from 2012.

6. Effects of flooding to men, women, elderly and children.

About 33% of respondents answered that they lost some form of income due to the flood, while 38.82% said as not having been affected. Reasons for the income loss include absence form work (47.57%), temporary closure of the work place (32.04%). Estimated income loss reached as high as Php 80,000.00, while minimum loss was about Php 5,000.00.

A focus group discussion of women in Barangay Mahogany, a barangay where most houses are within the floodway, revealed surprising insights from living under the constant threat of being flooded. All of them would not want to relocate or leave the place. More than half of those present have already built the floor of their houses 10-12 feet off the ground through extended posts or stilts. The highest recorded flood was 8 feet. They claimed the floods have made the community closer. Flood alerts spread quickly, although some claimed to have a way of 'reading' the waters as it rises providing them with a clue when to actually evacuate towards the road dike, some 200 meters from the farthest house which is along the river bank.

The women describe the flooding experience as a break from their daily routine, some even say that it was a fun or enjoyable experience, especially during the 'bakwit' operations, but they all say the situation gets boring while waiting for the water to subside, usually 4 to 5 days. The main issues they have to contend with are food supply, sanitation, privacy, and theft.

At Pagatpatan resettlement site, 6 members and the Chairman of the Sangguniang Kabataan (SK) were gathered for a focus group discussion. They all come from different flood affected barangays in the urban area. The most recent flood they experienced was Agaton (2014) wherein three participants have not yet relocated. They shared a common feeling of uncertainty during the onset of the floods and while staying in schools or covered court as temporary shelters. But what they all remember the most was the food rationing, sleeping on the floor, no walls dividing them among other people and children. Although none of them got sick, they also remembered the noise and the heat.

C. SUSTAINABILITY MECHANISMS

After the creation of CARBDP through PD1556 on June 11, 1978, which specifies the City of Davao as base office having road access to both Cotabato and Agusan, the LADP was created to spearhead the Agusan River Basin Development. LADP commissioned Technosphere Consultants Group, Inc. in cooperation with Nippon Koei Co. Ltd in 1980 to undertake the Feasibility Study of the project, and submitted on June 1981. Consequently, the Detailed Engineering commenced on September 1, 1982. A 4-volume Detailed Report was finalized on October 1983.

The FCC was implemented in two phases: FC-I between 1988 and 2000 through a loan from 14th Yen OECF Credit Package; and FC-II was undertaken from 1997 to 2007 under a support from the 21st Yen OECF Credit Package.

1. Maintenance and Operation of the Facility

   The organizations responsible for the O & M of the flood control systems and urban drainage facilities are the DPWH District Engineering Office (DEO) and the City Government of Butuan. A Memorandum of Agreement (MOA) was signed between the DPWH and the Butuan City Government in February 2008 defining the responsibilities of the O & M, according to the Ex Post Evaluation, as follows:

   a. The Butuan City Government will maintain the sluices and other structures, embankment levees channel (Cut-off and Urban Drainage) and all the structures / works not along the national roads.
   b. The DPWH Butuan City DEO will maintain the Magsaysay Viaduct, Cut-off Channel Bridge and the Box Culverts along the national roads and highway.

   However, as reported in the Ex-post evaluation, the CARBDPs PMO in Butuan City was still undertaking periodic maintenance activities on a very limited scale since there were no clear responsibilities for O & M between the city government and the DPWH.

   On January 2012, amendments to the MOA were done due to the funding constraints expressed by the City of Butuan on the cost of maintenance. The main features of the amendment were the following:

   a. Turned over to the City of Butuan
      i. T. Calo–Suatan–Masao Channel with length of 6.2 kms.
      ii. Doongan Creek Channel with a length of 1.4 kms.
      iii. Sosompit Creek Channel with a length of 1.4 kms.

   b. Completed structures retained by DPWH
      i. East Bank Levee – 12.1 kms
      ii. Cut-off Channel – 6.2 kms
      iii. Maug Creek Drainage Sluice – 2.5m (w) x 3.0m(+1) x1 lane
      iv. Mahay Creek Drainage Sluice – 2.5m (w) x 3.0m(H) x1 lane
      v. Banza River Navigational Sluice – 5.0m (w) x 5.5m(H) x2 lanes
      vi. Tumampi Vehicular Bridge – 4.5(m) x (15m+18m +15m span)
      vii. Improvement of Banza River – 6.2 kms.
      viii. Banza Pedestrian Bridge – 2.15m(w) x 18.0 (L) x4
      ix. Mandacpan – Bonbon Channel – 3.7 kms
      x. Libertad – Masao River – 2.9 kms
      xi. Middle Reach (Mandacpan – Libertad Bridge) – 3.2 kms.

2. Periodic Monitoring of the Installed Flood Control System

   After the project turnover in 2007, several joint JICA-DPWH Inspections were conducted every two years (2009, 2011, and 2013) mainly to check on the project's sustainability mechanism. All the structures, except Magsaysay Viaduct (628 m), Cut-off Channel Bridge (90 m) and Approach road (135 m) were turned-over to LGU Butuan City on February 2008 through a Memorandum of Agreement (MOA). In 2012, Amendment No. 2 strengthened the MOA signed by Mayor Ferdinand M. Amante, Jr. The main features of the MOA are the following:

a. Butuan City Government will maintain the sluices and other structures, embankment levees, channels (cut-off and urban drainage), and all other structures/works that were not along the National Roads.

b. The DPWH Butuan City DEO will maintain the Magsaysay Viaduct, Cut-off Channel Bridge, and Box Culverts along the National Roads and Highways. The DEO is tasked in the repair work of drainage and levee structures, and the City ENRO is tasked to de-clogging the drainage facilities from trash, vegetation and debris.

According to Engr. Sergio Mulawan LAPD-PMO OIC Project Engineer, as early as 2012, the Japanese Government recommended to the DPWH Central Office to take-over the maintenance responsibilities from Butuan LGU after finding out that the structures were poorly maintained. However, it was only in 2014 that LADP-PMO took over the job.

The focus group discussion with Barangay officials in the commercial area along M. Calo St., G. Flores Ave., R. Calo St. and Montilla Blvd. confirmed that street canals and drainage were not maintained. Canals were full of trash, and the open drainage have become garbage dumps, have vegetative growth and covered with water lilies as seen from drone photos. In the embankment levees, there were potholes. The worst part of the inspection was that the steel parts of the urban drainage sluices were stolen. The PMO recovered some parts at a junk shop and kept them in the PMO compound until replacement becomes available.

Missing Urban Drainage Sluices

In 2012, LADP PMO recovered from a junk shop with police assistance various steel gate materials and lifting mechanisms of sluice gates that were part of the urban drainage system or open canals at Doongan, Suatan and Masao.

Figure 28*. Recovered steel parts of the drainage sluice gates*

The recovered properties are now kept at the LADP PMO compound. According to Engr. Mulawan, the steel materials can still be re-installed with minor repairs and replacement of the rubber seals. However, LADP PMO would rather let the LGU implement the re-installation of the sluice gates as they have already been turned-over to them, and in order to instill ownership of the project.

The effect of the missing drainage gates or sluices is the backflow of about less than 1 meter of sea water during high tide by entering via the Doongan, Suatan and Masao drainage system from Masao River where the drainage canal is connected. Sea water flows 'upstream' toward the city center within the confines of the canal and in the process a certain volume of sea water enters the protected area through the openings where the drainage gates were supposed to block it. The sluices were designed to be closed at high tide. The intrusion extent is about .5 meter from the drainage openings and dissipates into the low-lying areas in Doongan and Suatan.

Overall, the missing sluice gates did not directly affect the efficiency of the floodwall and levees. Figure 29 illustrates the effect of the missing drainage sluice gate at Brgy. Doongan.

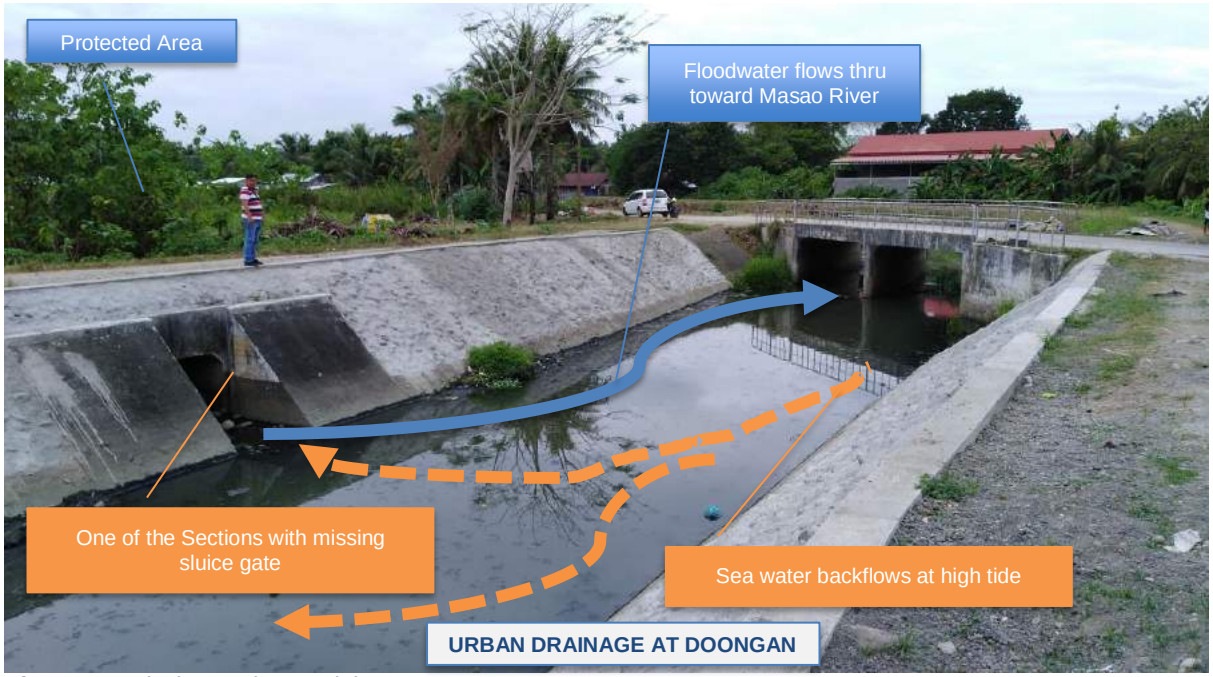


Figure 29. *Missing Drainage Sluice at Doongan*

3. Feedback from Communities Affected by Flooding

Communities affected by flooding have different interests and concerns, classified as: a) those who remained in the floodway; b) relocated families in the resettlement areas; c) communities benefitted from drainage canals; and d) communities with agricultural areas as means of living.

a. Those who remained in the floodway

Most of those presently living along the floodway (79.25%) are aware that it was declared as a hazard area or danger zone and almost the same number (78.19%) are aware of the danger in staying in the area. More than half (59.04%) acknowledged to being advised to relocate, while 33.51% answered they were not told to so.

Given the chance, 68.08% considered transferring to an area outside the floodway, but 24.47% do not have plans to relocate.

The main reasons of staying in the floodway includes being not in the "tagging" list, being new in the area, and staying in the relocation sites did not conform to either their personal preferences or too far from their source of income.

Those who are determined to stay in the floodway reasoned out that flooding occurs for just several days, but they are undisturbed by it for the rest of the year. As adaptation to the floods, they built their houses on stilts (wood piles or poured concrete), where the main floor is about 12 feet from the ground.

In Barangay Mahogany, they observed that the current of the water during floods has become stronger. This could be due to the levees confining the flow of water within the floodway.

b. Relocated families in the Resettlement Areas

FGD participants raised different comments on the effectivity of the resettlement areas offered to those who cooperated to be relocated. Most of the relocatees asked for livelihood support because most were separated from their source of income when they decided to transfer.

Federation President O.S. Toledo claimed that the 84 ha resettlement area in Pagatpatan is a fault line area and expressed apprehension of a disaster.

Others expressed their disappointment on the process of selection of relocatees wherein those coming from other barangays were accommodated while those who were original residents in the relocation site were not given priority. Some claimed that prioritization needs connection and endorsement from those who are in power and not on the situation of the affected resident.

Most of the respondents agreed that the project is affective in mitigating flood as evidenced by the degree of flooding after is completion.

Other comments that need concern and attention are:

Issue on the assumption of rights over the housing project in the IRA. Those who have assumed signified their willingness to pay the monthly amortization but authorities did not give it importance. They claimed to have assumed as early as 2002 and the estimate of the assumed houses ranges from 40–50%.

Other relocatees expressed their sentiments to have stayed firm not to transfer because there were more settlers now from where they vacated than those who left and were allowed to stay.

There are affected residents that were already tagged, but refused to resettle. This issue is being used by affected residents, willing to relocate, but were not accommodated.

c. Communities that benefited from the improved Drainage Canals

The respondents in the protected area recalled the floods that occurred in 1980, 1983 and 1997 that paralyzed businesses in Leon Kilat and Urduja, used to be the commercial center of Butuan City, like G. Flores Ave, reaching as far as Montilla Blvd., T. Calo St. and Langihan Road. They constantly experienced discomfort due to the seasonal evacuation.

They also discussed the hardships encountered by CARBDP implementers in negotiating the ROW of the FC-I that affected the project implementation.

They acknowledged that the levees and floodwall mitigated the flooding from Agusan River, and expressed confidence of its effectiveness, and confirmed that the government was right in pursuing the project.

After the project, the yearly evacuation due to flooding in the protected area have stopped and eased the residents of disturbances.

The occasional flooding in the city streets have became manageable and they attributed it to the improved drainage system.

d. Agricultural lands as source of livelihood

Affected with the reduced production of rice agricultural lands attributed to the structures of LADP particularly the earthen levee and the cut-off channel are barangays Mahay and Tagabaca. During the FGD, the farmers insinuated that before CARBDP, they have no problem about their

source of water which they used to pump from the creek. While the project was being implemented, illegal mining were undertaken in the upper barangays of Basag and De Oro. The accumulated tailings were brought by floods to Tagabaca and Mahay, filling the bottom of the creeks and spread to their paddies. During dry season, no water could flow to the creek as source of irrigation. These creeks are supposed to drain into the cut-off channel. But due to non-maintenance of the water way, it was blocked with silt and debris. When heavy or extended rains come, their farms become flooded. During dry season, the farmers do not have a source of irrigation water. As to their losses they claimed 15–50 % reduction from their former production level.

Farmers inside the floodway insisted to stay because they depend on the farmland. Although the risk is high, they still plant their paddies whenever good weather allows.

As to the design of the levee, some suggested that it should have been wider to safely accommodate two lanes. Others also suggested that the RC box culverts be replaced with flood gates to be closed when Agusan River swells to protect their rice field. Most of them suggested that the entire length of the levee be riprapped to refrain from breach which nearly occurred in 2014 flood, with only 1 meter left to the levee level.

They however, acknowledged that the levee and cut -off channel have more advantages than disadvantages. The levee mitigated flood from Agusan River and served as their alternative access to the city especially during flood. Repair and maintenance should be undertaken regularly. The cut-off channel, they said, drained most of the runoff water from the upper barangays.

D. IMPLEMENTATION GAPS

The implementation of FC II was done in batches because it was decided to defer the implementation of CP I and II until the development of a Resettlement Plan for the floodway affected residents have been resolved. This was underscored during the flood in February 5 – 10, 1999, caused by monsoon rains, months before the result of the FC II Design Review report was submitted. In 2000, LGU-Butuan demanded an Overall Resettlement Area for the entire project affected families.

CP III was awarded to Kajima Corp./Ciriaco Corp. under a joint venture, and started on March 28, 2000 with expected completion on January 27, 2004. It was completed on August 13, 2004, with only 6 months slippage and no major revisions but with cost adjustments by Php 183,257 million.

CP IV was also entrusted to Kajima Corporation, started construction on April 2001 and expected to be completed by February 11, 2004. However, the project dragged until May 31, 2010 until its completion incurring an increase in cost by Php 429.150 million.

On the other hand, CP I was finally awarded on June 28, 2003 to China International Water and Electric Corp. It was deemed to be completed on November 25, 2005. It was actually accomplished on October 12, 2006 with an increase in cost by Php 250.361 million.

FF Cruz and Co., Inc., won the bid for CP II on April 2, 2004. It was completed on August 30, 2007 more than a year from its initial completion date set on July 3, 2006.

On January 5, 2005 DPWH submitted to ICC-TB a request for a 18-month project extension of the loan closing date from June 26, 2005 to December 26, 2006 and an increase in cost of Php 1,993 M (from Php 2,636.90 M to Php 4,630.4 M) equivalent to 75% of the total project cost. DPWH submitted the breakdown of the proposed cost as follows:

***Table 19**. DPWH Breakdown of Project Cost*

Project Components	ICC-CC Approved Cost @ 1.0 Php = 4.0 Yen	Project Cost	Difference %	
	Php m	Php m	Php m	%
1. Civil Works	1,528.20	2,780.20	1,252.0	82 %
2. Consultancy	307.0	450.0	143.1	47 %
3. Contingencies	166.70	1,214	(45.3)	(27)
4. Price Escalation	144.30	144.30	0.0	-
5. Right of Way	322.0	994.8	672.8	209
6. Administrative Cost	168.8	139.7	(29.1)	(17)
	2,636.9	4,630.4	1,993.5	

Source: Memorandum, ICC-TB 27 April 2005

Right of Way increased by 209% and civil works by 82% respectively. Consultancy also raised by 47% while Contingencies and Administrative costs decreased.

DPWH rationalized that the increase in civil works was due to currency exchange rate changes (Php854 million) and 8 variation orders and 4 supplemental agreements (Php398 million).

For consulting services, there was an increase in the project cost at Php 139M due to currency exchange rate increase and extended service, June 2003 - June 2005, Php 4M.

The numerous ROW issues were partly due to the increase in land valuation (Php 133 M), acquisition of sites not originally considered in the construction / improvement of proposed facilities (Php 353M) and additional purchase of 70 hectares of resettlement sites for the ORA (Php 187M).

Upon strict scrutiny by the Investment Coordination Ccommittee (ICC) – Technical Board, another proposal was submitted on May 3, 2005 that reduced the amount of the project by Php 193.1M. Finally, on July 29, 2005, a final proposal was submitted that further reduced the amount by another Php 37.4M, bringing the proposed increase by Php 1.763M from the ICC–CC approved cost of Php 2,637M to Php 4,399.9M. In each reduction request, certain civil works were deleted including the flood forecasting

warning system and allocation of physical contingencies. Price escalation was also a factor in the reduction in civil works.

There was an issue regarding the lack of ICC approval for the earlier changes in cost, scope and payment of foreign currency for local expenditures. The city appraisal committee and BIR zonal valuation of the land acquired as ROW and relocation site, confirmation on whether resettlement costs form part of the civil works. They were asked to explain why the Department decided to acquire vehicles on a rent to-own basis despite the fact that the Office of the President disapproved the acquisition of such vehicles. And classification explanation on the circumstances beyond project management level that brought about the 3-year delay in implementation were also clarified/justified.

DPWH was also required to explain / clarify on the reduced administrative cost despite the delays encountered vis-à-vis the ICC approved levels. One of the requirements of the ICC for project approval is an endorsement from the Regional Development Council (RDC). The documents were submitted on October 2003 for the final endorsement of CP-I.

Accordingly, completeness of the documents determines the speed of the review and evaluation process. In the case of CP I, the chance to pass through the RDC Infrastructure Committee was between November and December 2003 in order to be eligible for endorsement by the RDC Full Council.

The RDC, through the Executive Committee, can facilitate the endorsement of a project as urgent subject to the justification of the sponsoring agency. The endorsement was obtained on May 2004.

E. PROJECT OUTCOMES

1. SHIFTS IN LAND USE AND LAND MARKET VALUES

Slight changes in the ratio of the type of land use (residential, commercial, agricultural and industrial) were observed in Butuan City from 2011 to 2018. Over this eight (8) year period, there are indications of a reduction of land dedicated to agriculture and gradual shifts to other uses. However, Agriculture has still consistently remained as the dominant land use type at 83.28 % followed by industrial, residential and commercial. This data indicates conversions from agriculture both Industrial and Residential uses and from residential to commercial uses. This shift in land use is also reflected in the Vegatative Index in Figures 37 & 38 which indicates a substantial increase in built-up areas in Butuan City from 1976 to 2015.

In terms of rate of increase of specific land use, Figures 30 to 32 reflect an upward trend in the area dedicated to residential, commercial and industrial use, with residential use reflecting the highest rate of increase at 10.67% specifically from 21,920,349 sqm. in 2011 to 24,260,171 sqm. in 2017. Areas dedicated to commercial use also increased from 18,936,144 sqm. in 2011 to 19,447,024 sqm. in 2017 while areas used for industry increased from 52,323,167 sqm. in 2011 to 52,945,904 sqm. in 2017. Land dedicated to agricultural use also increased which could only mean that some forest land was converted to agricultural use.

Aside from increases in land area in all types of land use, Land Market valuations also registered upward trends in all sectors with commercial land uses reflecting the highest value increments particularly for years 2016-2018 (See Figure 33). Figure 34 and 36 reflect the increasing trend in Land valuations for both Residential and Industrial lands. However, it can be noted that data for Industrial land use in terms of area (Figure 32) land valuation (Figure 36) reflected a reduction in 2015. This inconsistency in the increasing growth trend can be attributed to the implementation of EO 23 or total log ban which had a devastating effect on the predominantly wood-based dependent industrial profile of the Butuan City's Industrial Sector.

All things being considered, Butuan City's Shifts in Land Use and Land Market Valuations have registered modest gains over the years 2011 to 2018.

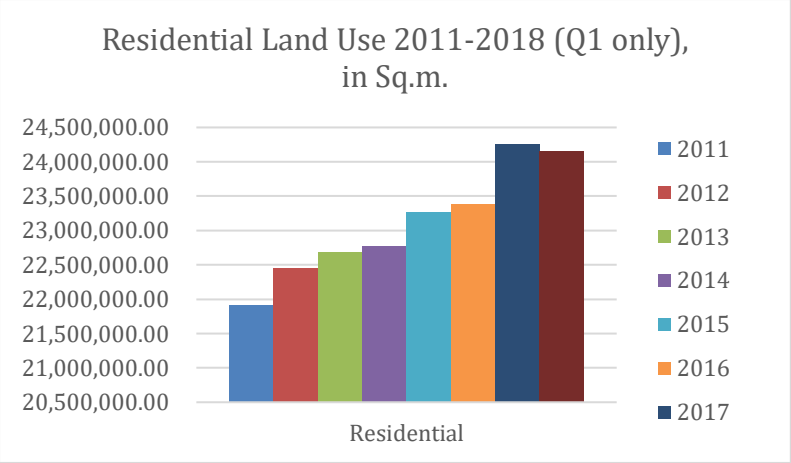


***Figure 30**. Annual Residential Land Use Changes 2011-2017*
Source: Butuan City Assessor's Office

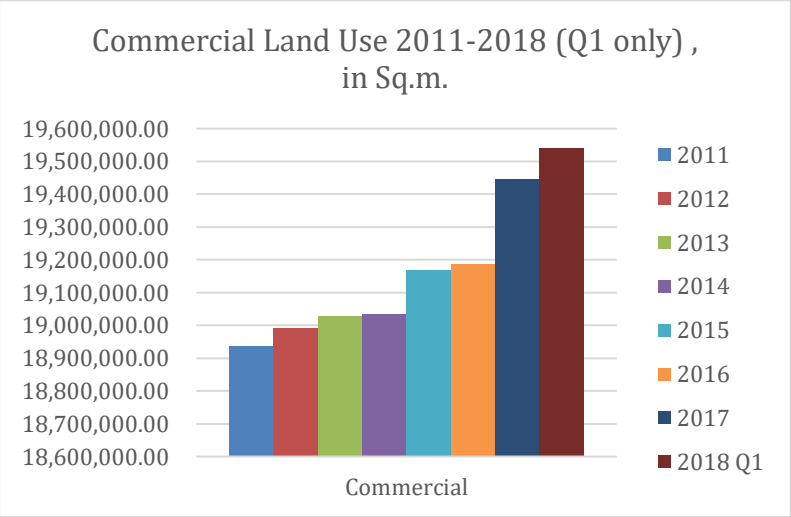


***Figure 31**. Annual Commercial Land Use Changes 2011-2017*
Source: Butuan City Assessor's Office

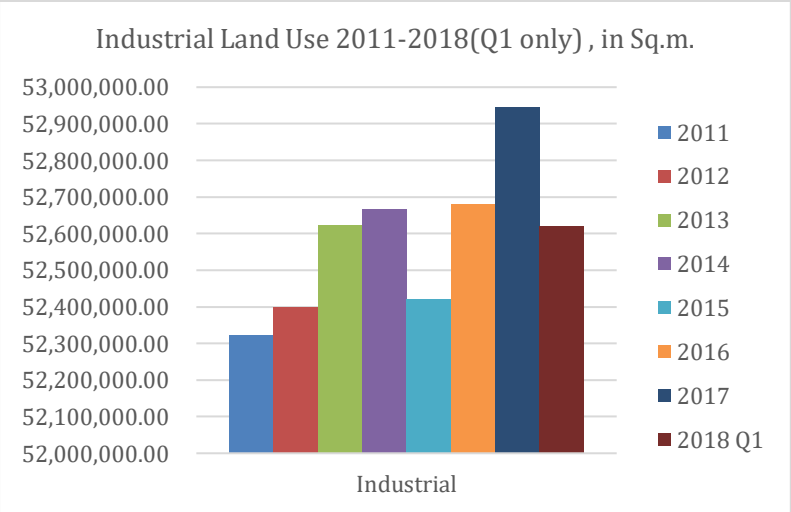
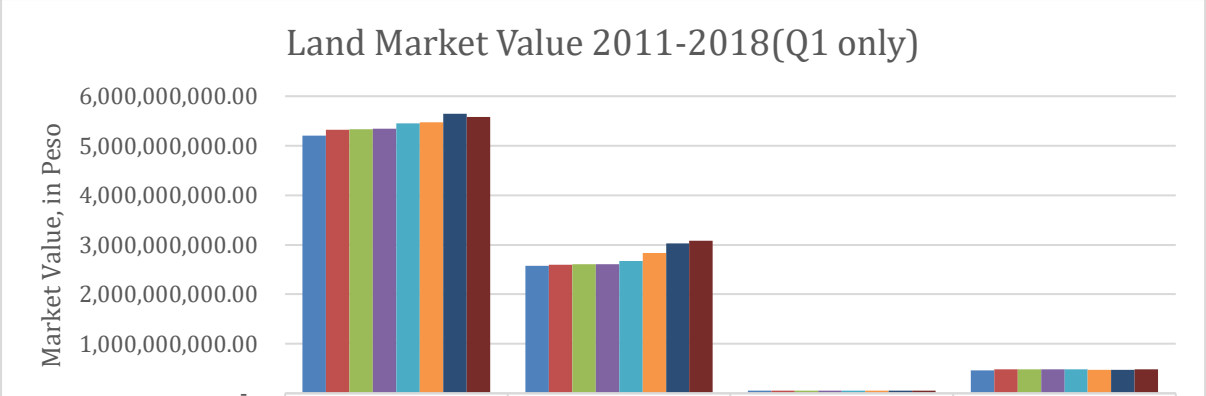


***Figure 32**. Annual Industrial Land Use Changes 2011-2017*
Source: Butuan City Assessor's Office



	Residential	Commercial	Industrial	Agricultural
2011	5,206,346,001.0	2,576,938,893.0	52,323,167.33	465,610,427.57
2012	5,326,988,702.0	2,597,445,022.0	52,397,447.33	482,023,798.57
2013	5,329,963,112.0	2,607,678,992.0	52,622,302.33	484,560,281.57
2014	5,348,270,392.0	2,610,881,002.0	52,667,302.23	483,436,842.57
2015	5,446,007,562.0	2,673,035,672.0	52,421,802.17	484,226,015.58
2016	5,474,407,768.0	2,836,513,212.0	52,680,192.17	478,872,126.58
2017	5,649,132,214.0	3,030,648,882.0	52,945,904.17	479,052,052.58
2018 Q1	5,582,705,559.0	3,081,377,612.0	52,620,153.58	479,851,362.58

***Figure 33**. 2011-2018 Land Market Value, Butuan City*
(Source: Butuan City Assessors Office)

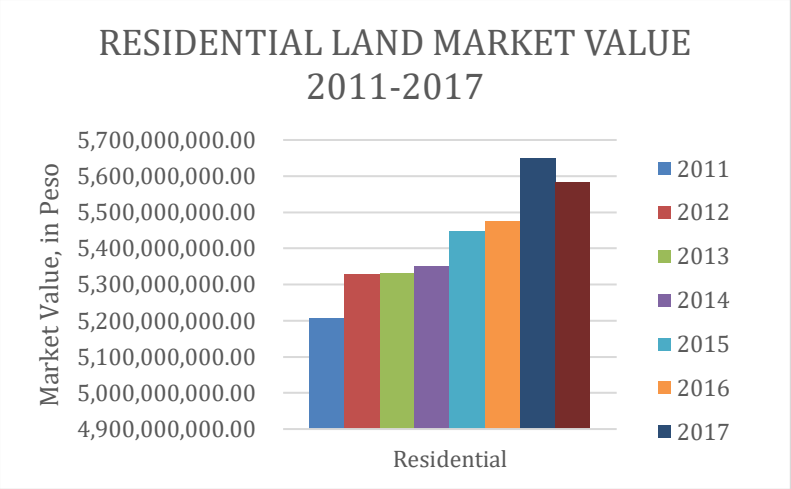


***Figure 34**. Annual Residential Land Market Value 2011-2017*
(Source: City Assessors Office, Butuan City)

***Figure 35**. Annual Commercial Land Market Value 2011-2017*
(Source: City Assessors Office, Butuan City)

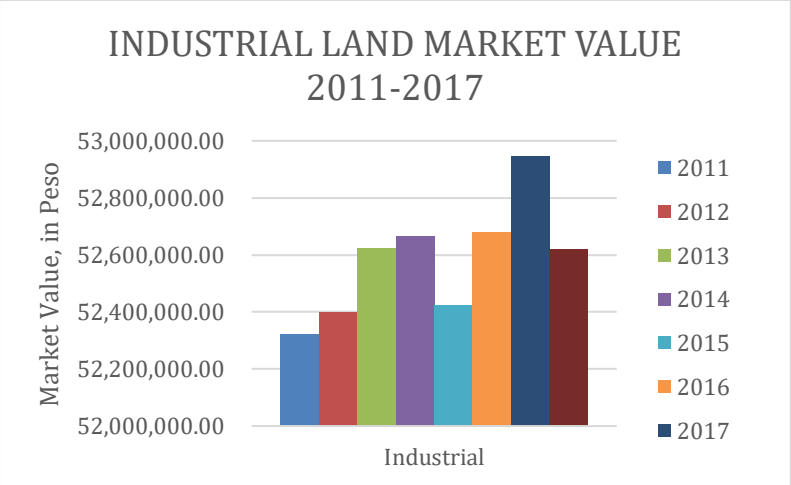


***Figure 36**. Annual Industrial Land Market Value 2011-2017*
(Source: City Assessors Office, Butuan City)

Table 20. *Real Property Assessment 2007 - 2018 (Q1)*

YEAR	RESIDENTIAL			AGRICULTURAL			COMMERCIAL			INDUSTRIAL		
	Units	LAND AREA (SQ. M)	MARKET VALUE (Php)	Units	LAND AREA (SQ. M)	MARKET VALUE (Php)	Units	LAND AREA (SQ. M)	MARKET VALUE (Php)	Units	LAND AREA (SQ. M)	MARKET VALUE (Php)
2007	50,903	397,822,647.50	2,189,209.550	18,643	22,266,192.28	480,780,601	3,040	854,863,700	531,914,093	1,126	2,554,327	307,438,189
2008	-	-	-	-	-	-	-	-	-	-	-	-
2009	54,157	1,012,623,864.10	5,249,847,544	19,521	509,942,449.21	1,119,987,684	4,509	18,774,993.48	2,468,905,411	831	53,270,300	503,377,729
2010	55,341	1,012,318,019.38	4,941,583,911	19,966	501,899,037.41	1,034,453,834	4,627	18,895,135,610	2,543,526,377	761	51,911,409	469,446,239
2011	59,080	21,920,349.281	5,206,346.001	21,138	465,610,427.57	1,086,727,825	5,024	18,936,144.500	2,576,938,893	820	52,323,167.33	588,694,329
2012	62,516	22,451,709.201	5,326,988,702	21,847	482,023,798.57	1,088,872,275	5,203	18,991,543,500	2,597,445,022	859	52,397,447.33	595,760,119
2013	65,272	22,684,915.701	5,329,963,112	22,498	484,560,281.57	1,089,368,865	5,401	19029355.500	2,607,678,992	876	52,622.302.33	617,285,749
2014	67,609	22,774,863.181	5,348,270,392	22,991	483,436,842.57	1,088,867,794	5,562	19,034,290.500	2,610,881,002	917	52,667,302.230	622,500,559
2015	69,607	23,268,909.411	5,446,007,562	23,362	484,226,015.577	1,084,080,663	5,671	19,168,731.500	2,673,035,672	985	52421802.170	582,181,389
2016	71,421	23,387,481.061	5,474,407,768	23,624	478,872,126.577	1,081,100,234	5,091	19,187,904.500	2,836,513,212	1,014	52,680,192.170	602,931,249
2017	73,427	24,260,171.961	5,649,132,214	24,025	479,052,052.577	1,075,362,624	6,145	19447024.502	3,030,648,882	1,039	52945904.170	625,341,499
2018 1stQ	73,891	24,158,452.461	5,582,705,559	24,165	479,851,362.577	1,076,316,884	6,201	19,542,331.500	3,081,377,612	1,040	52,620,153.580	593,073,449
Increase / Decrease												
2018 1stQ	22,988	373,664,195.039	3,393,496.009	5,522	457,585,170.297	595,536,283	3,161	18,687,467.8	2,549,463,519	-86	50,065,826.58	285,635,260

Source :Butuan City Assessors Office

2. Environmental Impacts

The environmental impacts of the LADP after project implementation is evident using Normalized Difference Vegetation Index (NDVI) which quantifies vegetation by measuring the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs).

For example, when the values are negative, it's highly likely that it's water. On the other hand, if the NDVI value is close to +1, there's a high possibility that its dense green leaves. But when NDVI is close to zero, there aren't green leaves, and it could be water, soil or even be an urbanized area.

Normalized Difference Vegetation Index (NDVI) uses the NIR and red channels in this formula:

$$NDVI = \frac{(NIR - Red)}{(NIR + Red)}$$

Healthy vegetation (chlorophyll) reflects more near infrared (NIR) and green light compared to other wavelengths.

Figure 33 shows two NDVI maps in two timeframes. Map1 taken in 1975 (before the LADP) and Map2 taken in 2015 (after the LADP). The images were captured by different Landsat satellite missions; 1975 - Landsat 2 with 60-m spatial resolution, and 2015 - Landsat 8 with 30-m spatial resolution.

Viewed in the context of the LADP implementation, Map1 (1975) taken 12 years prior to the start of construction, while Map2 (2015) was taken 8 years after the project turnover.

The comparison of the maps showed that in a span of 40 years from 1975 to 2015 the vegetation in Butuan City has decreased. Figure 34 displays an enlarged map that shows the change in vegetation is more evident in the city center, west of the FCS. There are evidences of urban sprawl indicating expansion of built-up areas and thus causing environmental degradation in the city area and in areas along the national highway. Notably, on the south-western part of the city near the FCS, the degradation is attributed to the numerous villages and housing projects that have since been established. On the north-western portion near the bay, the areas with no vegetation are fish ponds, rice paddies, swampy areas and exposed soil as a result of land development.

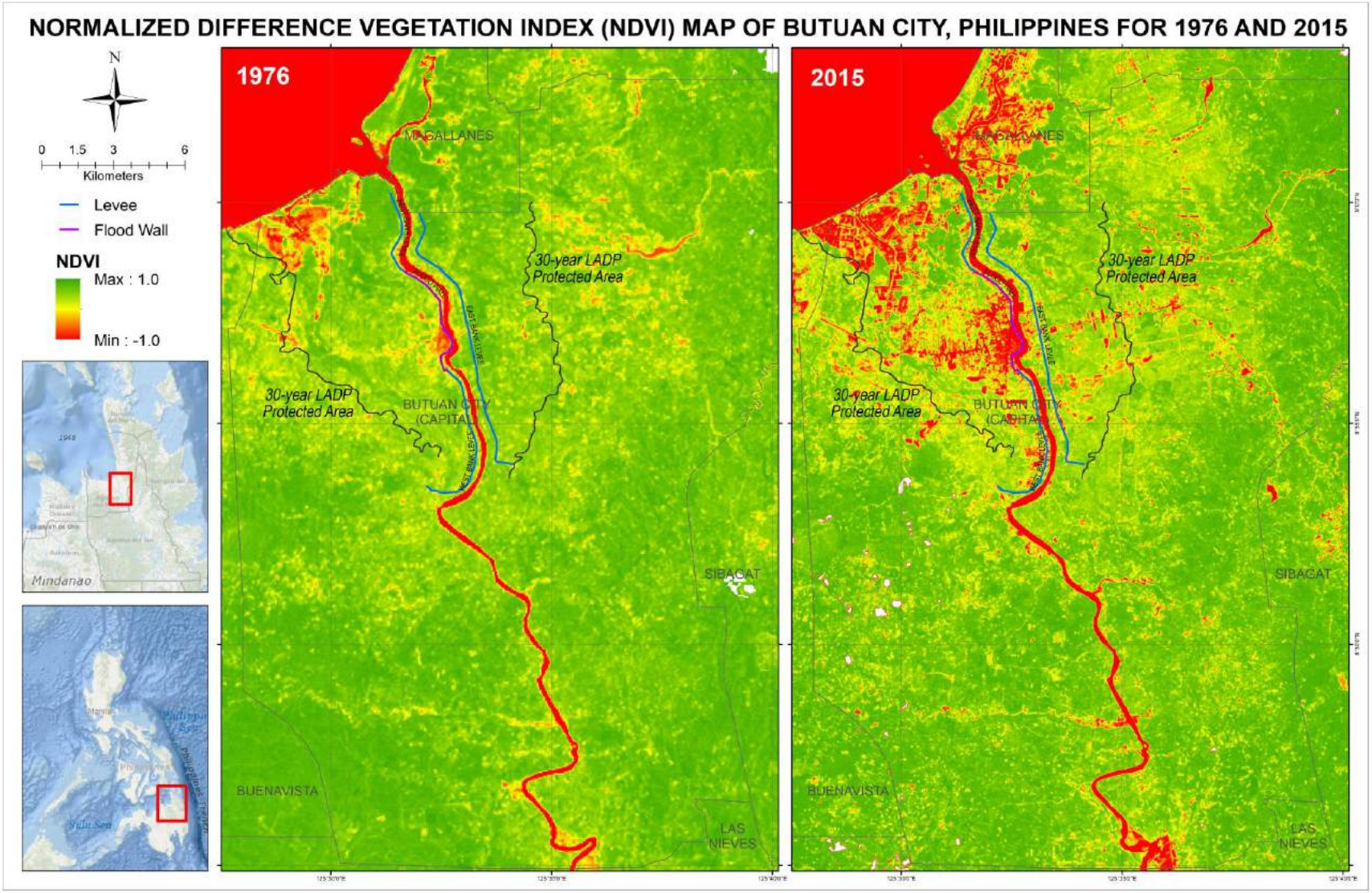


Figure 37. *Normalized Difference Vegetative Index (NDVI) Map of Butuan City, 1976 and 2015.*

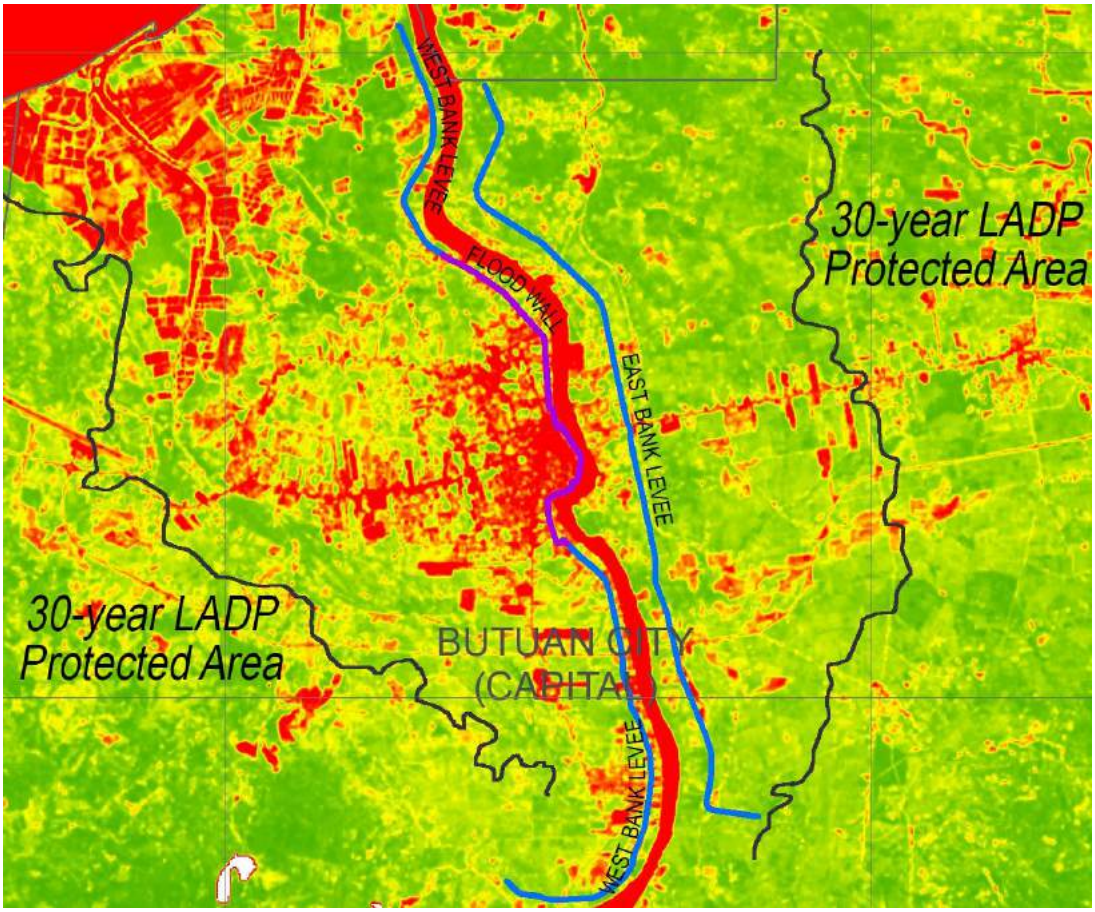


***Figure 38**. Enlarged image of 2015 NDVI map.*

Spatial analysis was conducted to know how the NDVI from 1976 to 2015 changed focusing within the 30-year LADP protected area. A total of 21,441 random sampling points were generated to the area of concern and were extracted with NDVI values for both 1976 and 2015. Linear regression analysis was then executed and determined the difference of values in general.

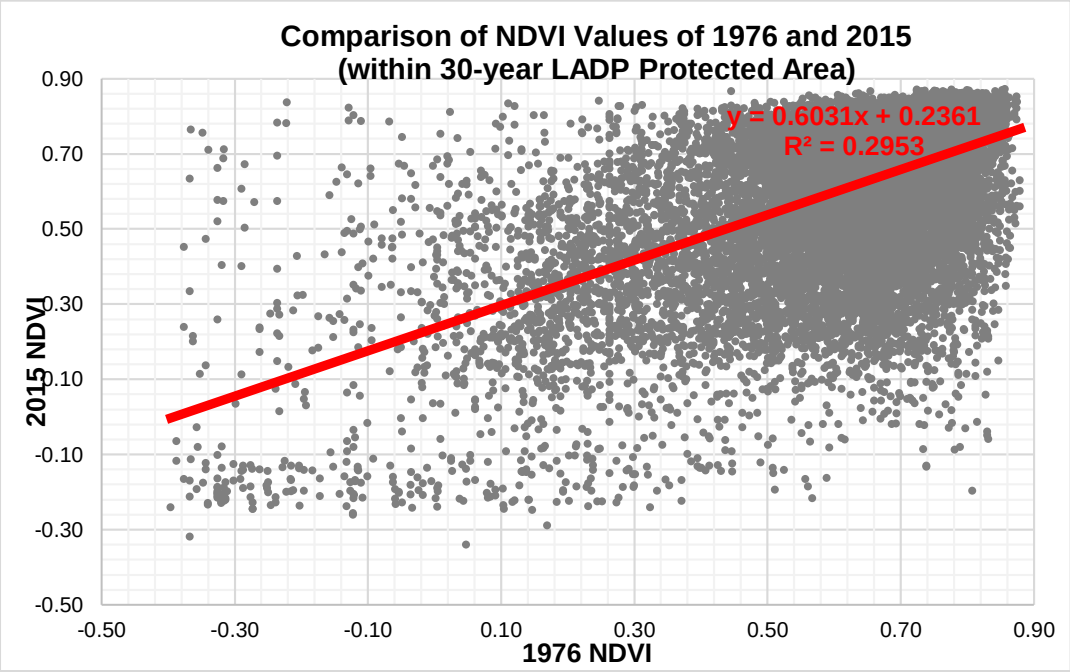


***Figure 39**. Comparison of NDVI Values of 1976 and 2015*

As shown in the figure, the changes in terms of vegetation and other land cover within the area of interest greatly varied and does not provide a concrete trend as indicated by the R^2 (coefficient of determination) calculated. This could be mainly caused by the prevalent urban development that can obviously be observed on the generated map. However, from the sampling points, great concentration of high NDVI values was observed; which are vegetated areas. Majority of these high values from 1976 are being decreased on 2015 based on the linear equation obtained.

Records from the City Architects Office shows a 150% increase in Approved Building Permits from 805 to 2,156 units from 2005 to 2015, respectively with an accumulated number of 23,539 units during the period. A report from the City Planning and Development Office shows that the LGU have developed 427.929 hectares of land into 120 subdivisions, while private developers have constructed 142 subdivisions involving 547.602 hectares. These are all within the 46 flood control influenced barangays.

About 248.28 hectares of fishpond/shrimp ponds were initially developed in the 70s in Barangay Masao and Lumbocan. The development expanded to Ambago, Agusan Pequeño, Libertad and Babag as the fishpond industry thrived in 1980s covering 1,171 hectares. These areas have no vegetation.

For the barren and light vegetation areas such as grasses, crops or shrubs (NDVI ranging from 0.1 to 0.3) in 1976 may already have been improved as it already provides higher NDVI on the 2015 map. The rice production areas in 20 LADP protected barangays, irrigated and rain-fed, has reached 2,959 hectares as of 2015.

3. Population Shifts

A population shift occurred in the vicinity or in barangays directly affected during and after the implementation of the project in the west bank most notably in the city center which was once the *poblacion*, a highly residential urban area. From 2000 to 2015, the least affected barangay is Bading with a negative 3.7% population growth, while the worst impacted is Sikatuna with -91.93%. There are various probable reasons for the negative population growth like the resettlement of affected residents, the residential structures in the area have been completely replaced with or modified into commercial buildings.

Table 21. *Barangays with negative population growth*

Barangay	2000	2015	% Decrease in Population	LADP Reference
Bading	5110	4921	-3.70	West bank
Port Poyohon	5221	4798	-8.10	West bank
Ong Yiu	5398	4859	-9.99	West bank
Buhangin	4946	4407	-10.90	East bank
Baan Riverside	6118	5376	-12.13	East bank
San Ignacio	3175	2637	-16.94	West bank
Golden Ribbon	5267	3833	-27.23	West bank
Rajah Soliman	701	465	-33.67	West bank
Agao	1174	778	-33.73	West bank
Silongan	1045	661	-36.75	West bank
Humabon	328	137	-58.23	West bank
Leon Kilat	536	163	-69.59	West bank
Urduja	594	83	-86.03	West bank
Sikatuna	533	43	-91.93	West bank

The decline in population in the west bank barangays which are in the commercial district can be attributed to a number of reasons. Those living in the floodway have finally transferred to the resettlement sites. Others have left the place due to city road expansions affecting their houses, the residential units have become commercial buildings, and others have transferred to any of the new subdivisions due to the worsening parking problems on very narrow city streets.

On the other hand, the other 19 barangays classified as rural (CLUP 1997-2010) showed an increase in population by 57% (84,884 in 2000 to 133,293 in 2015) led by Brgy. Pagatpatan (262%), Villa Kananga (201%), Mahay (142%), and San Vicente (98%). Pagatpatan, San Vicente and Mahay are resettlement areas of project-affected residents. Villa Kananga, Ambago, Bit-os, Baan Km3 and Doongan have become primary choices of property developers for new subdivisions and individual housing units.

Spaces along the national highway within the city have become a host for many commercial buildings within a 7-kilometer distance from the dike and levees both in the west and east banks. An increase of 75.45% (876 to 1537 new buildings) was reported by the City Architect's Office on the number of building permits issued by the office during the 2005 - 2010 and 2011 - 2017 periods. See annex 6.

Residential houses made of light materials had the highest increase in the same period by 174% (5,039 to 13,825 houses) to accommodate the increasing number of migrants and residents who can already afford to remodel and build their houses. For standard residential houses, which are mostly subdivision houses increased by 19.75% (3,415 to 3,892 units). Industrial buildings have a slight decrease of 3.57%.

a) Population density of the affected area or influence area

Flood Control Project

Table 22 shows the population of the affected area. There are 28 barangays affected by the project with about 113,741 individuals (2015 census, PSA).

With reference to the Agusan River banks, the West Bank has 68,580 residents, while the East Bank has 45,161 people living in the area.

Table 22. *Population of Affected Area*

	Barangay	Pop	Reference to Agusan River	Reference to Floodway
1	Agao Pob. (Bgy. 3)	778	West	Inside/Outside
2	Agusan Pequeño	5,070	West	Inside/Outside
3	Aupagan	1,660	East	Inside
4	Baan KM 3	11,308	East	Outside
5	Bading Pob. (Bgy. 22)	4,921	West	Inside/Outside
6	Banza	4,235	East	Outside
7	Buhangin Pob. (Bgy. 19)	4,407	East	Inside/Outside
8	Bit-os	3,166	West	Inside/Outside
9	Baan Riverside Pob. (Bgy. 20)	5,376	East	Inside
10	Golden Ribbon Pob. (Bgy. 2)	3,833	West	Inside/Outside
11	Humabon Pob. (Bgy. 11)	137	West	Outside
12	Leon Kilat Pob. (Bgy. 13)	163	West	Outside
13	Mahay	4,062	East	Inside/Outside
14	Mahogany Pob. (Bgy. 21)	5,218	East	Inside/Outside
15	Maon Pob. (Bgy. 1)	5,072	West	Inside/Outside
16	Maug	2,778	East	Inside/Outside
17	Port Poyohon (Bgy. 17)	4,798	West	Inside/Outside
18	Ong Yiu Pob. (Bgy. 16)	4,859	West	Inside/Outside
19	Rajah Soliman Pob. (Bgy. 4)	465	West	Outside
20	San Ignacio Pob. (Bgy. 15)	2,637	West	Inside/Outside
21	San Vicente	16,187	West	Inside/Outside
22	Sikatuna Pob. (Bgy. 10)	43	West	Outside
23	Silongan Pob. (Bgy. 5)	661	West	Outside
24	Tagabaca	3,487	East	Inside/Outside
25	Urduja Pob. (Bgy. 9)	83	West	Outside

	Barangay	Pop	Reference to Agusan River	Reference to Floodway
26	Obrero Pob. (Bgy. 18)	9,774	West	Inside/Outside
27	Pagatpatan	5,933	West	Inside/Outside
28	Pangabugan	2,630	East	Inside/Outside
		113,741	West-18 East-10	Inside/Outside - 18 Inside - 2 Outside - 10

NOTE: Inside/Outside means 18 Barangays were traversed by the project leaving an area inside the floodway

b) Incidence of water-borne diseases such as Schistosomiasis and other health issues

On health, HH survey shows that 13.16% of the respondents reported to have health problems due to flooding. Among those that the respondents reported were schistosomiasis (5%), dengue (12.5%), malaria (1%), leptospirosis (22.5%), and others (50%) like athlete's foot and rashes. Moreover, 55% received medical attention from barangay health centers, hospitals (PhilHealth), and in their homes.

Data from the City Health Office of Butuan shows the decreasing trend in the incidence of water borne diseases as presented in Figure 40. During the duration of TD Agaton, the City Health Office operated 45 evacuation centers and served 6,740 cases of different sicknesses, wounds and fractures, animal bites, skin diseases, aches and pains. Leading cases were fever, coughs, skin diseases and headaches from January 12–January 29, 2014. The city distributed medicines costing Php 234,637.000.

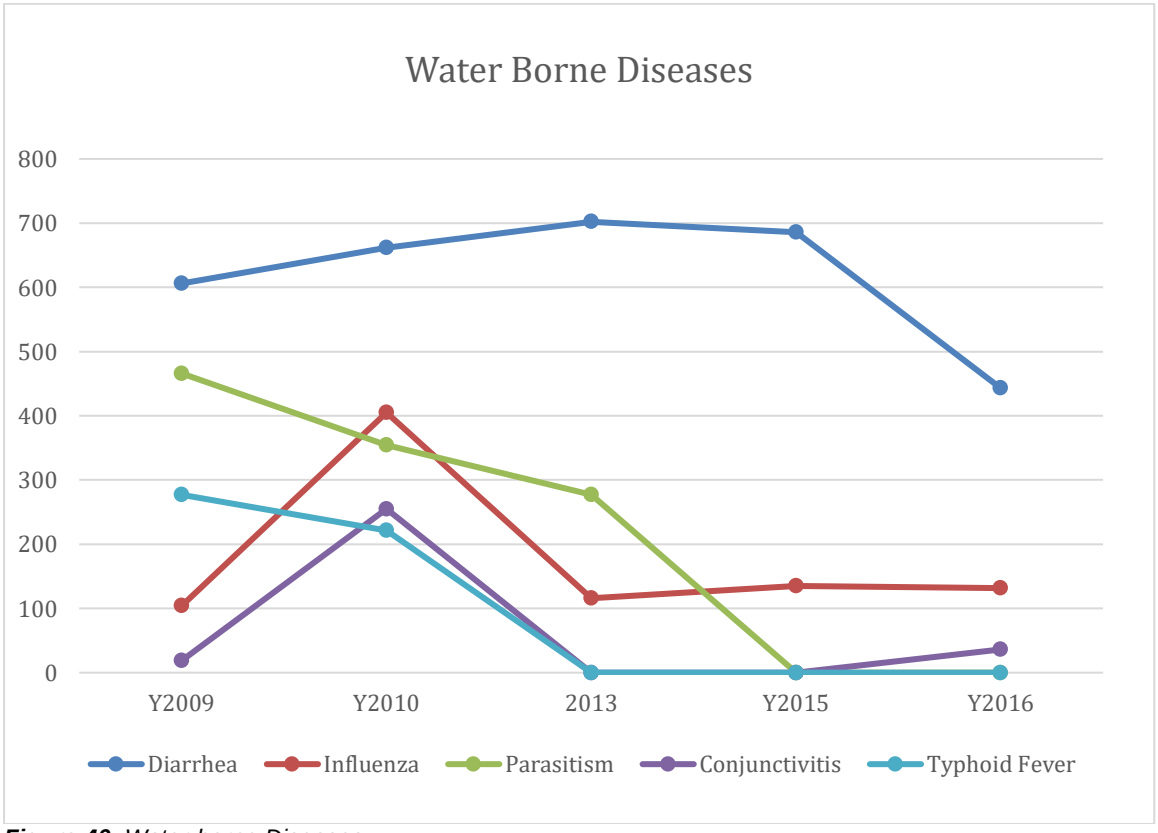


***Figure 40**. Water-borne Diseases*
Source: Butuan City Health Office

It was noted that the anticipated health problems such as Schistosomiasis, Dengue, Malaria, and Leptospirosis in the inception report were not experienced by the residents based on the report submitted by the City Health Office from 2009 to 2016. The leading diseases were Parasitism (311 cases), Typhoid fever (298 cases), Coughing (218 cases) and Conjunctivitis (87 cases).

Worst-case scenario was experienced in 2014, during TD Agaton, wherein the CHO handled 45 Evacuation Centers, served 6,740 cases; 1697 or 25.18% of the cases attended to were below five years old is a span of 17 days. The leading cases were fever with cough, colds or sore throat with 3,570 cases. Diarrhea-related cases were only 389. Skin infections and wounds had 529 cases.

The responses in the HH survey have validated the CHO's yearly report regarding the high incidence of athlete's foot and rashes, as well as skin infections and wounds during TD Agaton.

Reduced instances of water borne diseases were also reported by 89.6 % of the respondents. Almost the same level (89.8 %) answered in the survey that nobody in their family needed medical attention during the last flood.

4. Poverty Incidence/ Standard Of Living

The HH survey in the project influence area asked about their income status and standard of living compared 5 years ago, 41.10% said it's the same, 38.50% answered it is better now while 17.40% commented its bad.

The respondent's standard of living could be illustrated by their ownership of appliances, wherein 85% have TV set, 73.7 have stereo / Karaoke / radio, 34.6% have rice cooker, 43.8% have refrigerator, 44.5% have electric fan, 9.9% have heater and 18.0% have flat iron.

Moreover, these were 7.8% who have desktop computer, 2.6% have laptop, 5.5% have air-conditioning unit and 0.5% have electric stove.

The data provided by City Planning and Development Office, particularly on income and employment shows that the 2018 annual average HH income is P189,000/family, having wages and salaries as major sources of income. The per capita poverty threshold is P18,905 and P21,535 for 2012 and 2017, respectively.

As shown in Table 33, the larger part of the population shows that 88.5% depend on employment to sustain its living standards.

***Table 23**. Employment status of Butuan population as of 2015*

Employment	No. of Persons	Percentage
Employment Rate	186,160	88.5%
- Fully employed	139,252	66.2%
- Under employed	46,908	22.3%
Unemployment Rate	24,190	11.5%
Labor Force Population	210,351	100%

Source: CPDO, PSA

5. Caraga Gross Regional Domestic Product (GRDP)

The economic growth of Caraga indicated an erratic upward and downward trend for the period, 2010 – 2015. Caraga's GRDP was at its highest in 2012 at 11.5 percent making the region the fastest growing in the Philippines during that period. However, the region's economy slowed down in 2015 on account of a declining performance of the agriculture, fishery and forestry (AFF) Sector at 4.2%. GRDP bounced back to 5.2% in 2016, despite the prolonged El Niño that plagued the region, and further grew to 8.2% in 2017.

In 2016, AFF Sector grew to 5.8% and reached 6.6% in 2017. Although the industry sector had a negative growth of – 4.5% in 2016 due to decrease in mining and quarrying sub – sector, it bounced back to 8.3% in 2017 due to increase in construction.

The Service Sector at 52.5% of the GRDP in 2016 from almost half in 2015 (49.9%) had the highest growth at 10.64% in 2016 and 8.63% in 2017. Most of these are based in Butuan City being the Regional Center of Caraga. The influx of service-oriented businesses can be attributed by the

investment-friendly environment as a result of the concerted effort of the National Line Agencies (DTI, DILG and DICT) and the LGU in setting-up parameters and guidelines in the ease of doing business which has steadily increased confidence of investors in Butuan City and the region.

***Table 24**. Caraga GRDP at current prices, 2015-2017*

GROSS REGIONAL DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN REGION XIII, CARAGA REGION 2015-2017			
AT CURRENT PRICES			
INDUSTRY/YEAR	**2015**	**2016**	**2017**
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	32,929,781	34,849,960	37,160,411
a. Agriculture and Forestry	27,946,703	30,033,684	32,167,662
b. Fishing	4,983,078	4,816,276	4,992,749
II INDUSTRY SECTOR	46,716,498	44,618,246	48,354,651
a. Mining and Quarrying	19,734,331	16,180,232	16,256,617
b. Manufacturing	4,122,579	4,439,185	4,598,486
c. Construction	20,166,013	21,176,891	24,782,083
d. Electricity, Gas and Water Supply	2,693,575	2,821,939	2,717,464
III SERVICE SECTOR	79,392,011	87,840,612	95,419,262
a. Transportation, Storage & Communication	26,764,369	28,750,494	30,277,215
b. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	7,536,204	8,387,161	8,995,181
c. Financial Intermediation	8,376,453	9,790,789	10,822,112
d. Real Estate, Renting & Business Activities	11,726,934	12,811,419	13,769,547
e. Public Administration & Defense; Compulsory Social Security	8,611,882	9,584,310	10,728,404
f. Other Services	16,376,169	18,516,438	20,826,803
GROSS DOMESTIC PRODUCT	**159,038,290**	**167,308,819**	**180,934,323**

Source: Philippine Statistics Authority

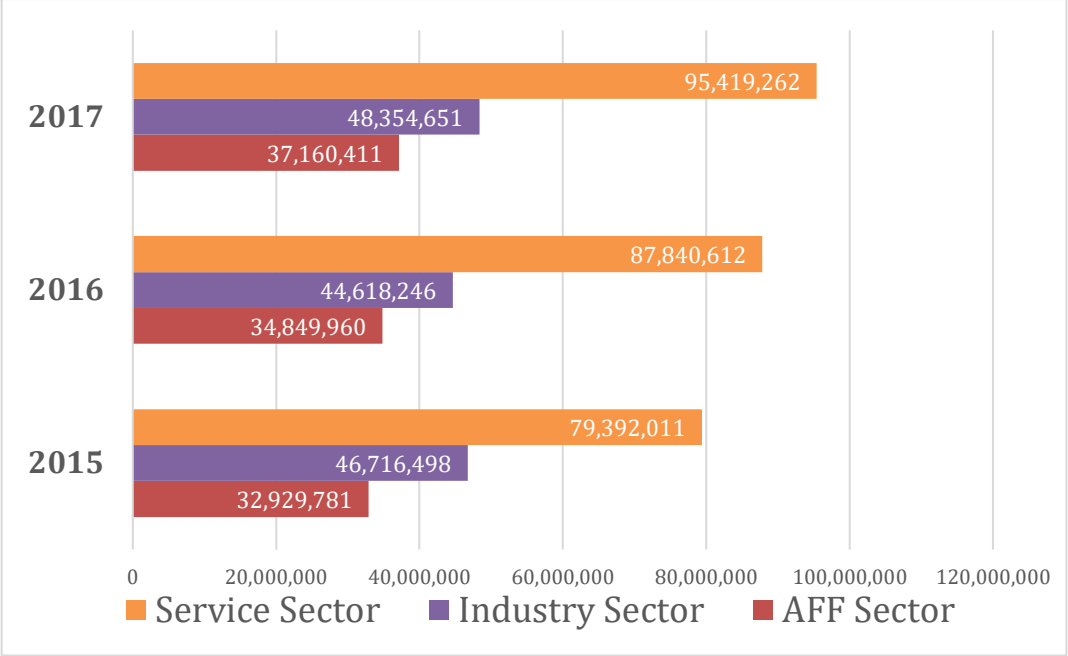


Figure 41. *Industry Sector Contribution to Caraga GRDP 2015-2107*

Table 25*. Caraga GRDP by Industrial Origin, 2015-2017*

GROSS REGIONAL DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN REGION XIII, CARAGA REGION 2015-2017			
PERCENT DISTRIBUTION, AT CURRENT PRICES			
INDUSTRY/YEAR	**2015**	**2016**	**2017**
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	20.7	20.8	20.5
a. Agriculture and Forestry	17.6	18	17.8
b. Fishing	3.1	2.9	2.8
II INDUSTRY SECTOR	29.4	26.7	26.7
a. Mining and Quarrying	12.4	9.7	9
b. Manufacturing	2.6	2.7	2.5
c. Construction	12.7	12.7	13.7
d. Electricity, Gas and Water Supply	1.7	1.7	1.5
III SERVICE SECTOR	49.9	52.5	52.7
a. Transportation, Storage & Communication	16.8	17.2	16.7
b. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	4.7	5	5
c. Financial Intermediation	5.3	5.9	6
d. Real Estate, Renting & Business Activities	7.4	7.7	7.6
e. Public Administration & Defense; Compulsory Social Security	5.4	5.7	5.9
f. Other Services	10.3	11.1	11.5
GROSS DOMESTIC PRODUCT	**100**	**100**	**100**

Source: Philippine Statistics Authority

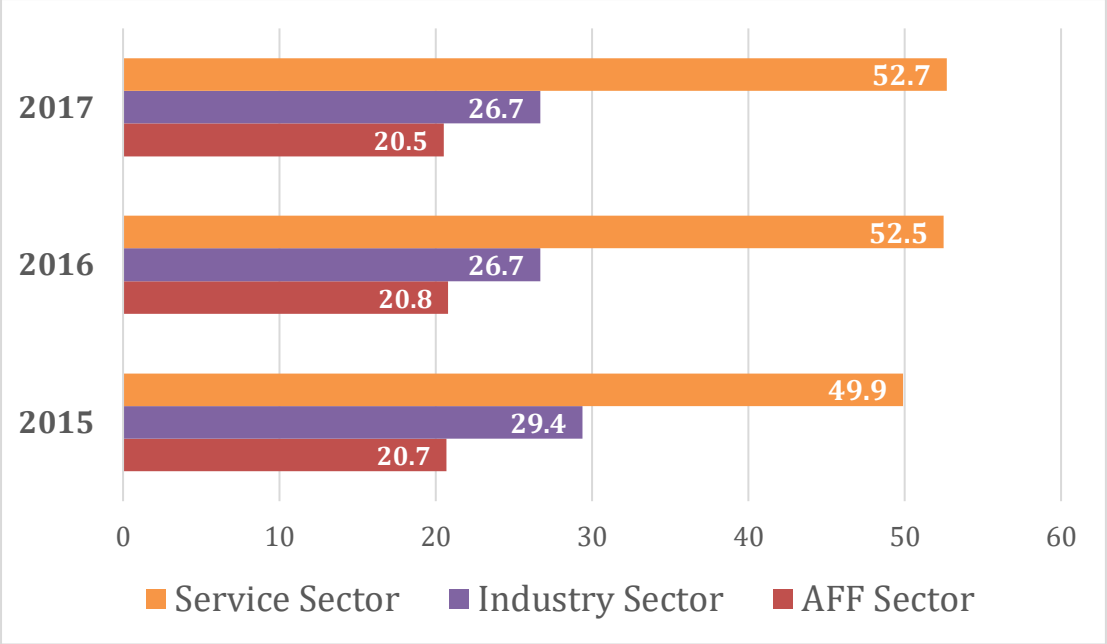


Figure 42. *Industry Sector percentage contribution to the GRDP of Caraga, 2015-2017*

6. Flood Damage to Agriculture at FCC Target Areas

The 2009 ex-post evaluation report cited that a comparison of the pre-FCC with the post-FCC situation could not be established to affirm that the FCC protected people, houses, agriculture and major infrastructure from a major flood occurrence. The report stated: “However, since there was no damage on agriculture and infrastructure in the floods after 2007 (completion of FC II) it is fair to say that this is the effect of the flood control components.”

In January 2014, TD Agaton caused an alarming flood situation, which reached the 1.5-meter freeboard limit. Although it was estimated that the magnitude of the flood was only about 4,000 cumecs (LADP – PMO) the flood level behaved like an 8,000 cumecs flood because of the obstructions (building & houses) in the floodway, shallowing of the Agusan River and high tidal occurrence at Butuan Bay. The situation was observed upstream of the Magsaysay Bridge, which was the narrowest part of the Agusan River.

TD Agaton inundated 48 barangays of Butuan City including 15 LADP-FCC target barangays, which were mostly rice areas. The City Agriculturist’s Office reported the rice were at seedling stage, newly planted and at vegetative stage. 43% of the potential rice areas were planted at that time.

Data provided from DA Bureau of Agricultural Statistics showed 4,675 hectares were planted and the affected area at different levels of flooding was 2,898 hectares or equivalent to 62% among the barangays. In the 15 FCC influence barangays, 1,482 hectares were planted, where 604 hectares were affected equivalent to 41%. It is safe to conclude that the flood control projects have protected the agricultural (rice) areas with 21% difference in the total rice areas flooded.

Although agriculture is the domain under the Irrigation Component of LADP, farmers at Barangay Mahay and Tagabaca ventilated their frustrations over the situation of their farms. They confirmed that the levee had saved them from the floods from Agusan River (only 60% were affected by the flood) however, the rain outfall from nearby areas at higher elevation had collected in the creeks that have been filled with sand and silt. They claimed that the damage would have been lesser had the ingress or start point of the east bank cut-off channel was extended about 1.2 to 1.5 kms and that it would have accommodated the outfall of two creeks, Lemon Creek and Tagabaca Creek, and therefore drained the whole area. LADP–PMO acknowledged that an unresolved Right of Way problem during implementation prevented the implementation of the cut-off channel to reach the said area as designed.

The costs of losses cannot be significantly compared because the costing parameters were only on the early stages of rice farm development, the oldest being only one month old. The cost at Seedling Stage is P3,500/ha; newly planted rice at P7,500/ha and Vegetative stage at P12,500/ha.

7. Flood Damage After The Project

After the project’s turn-over in 2007, the flood damage reports are found to be emanating from the residents inside the floodway who claimed that the flood on January 10, 2014 brought by Tropical Depression Agaton caused some minor damage in their personal belongings, furniture, appliances and fixtures. Majority of these residents knew the area is a danger zone (55.50%). Many of them (21.90%) still do not consider transferring to an area outside the floodway. Their main reason is that flooding is not a daily occurrence; it happens yearly and lasts 4 to 6 days and for the remainder of the year their way of life is undisturbed by floods.

F. PROJECT GAPS

1. Structural Design Gaps

The levee on the east bank has tapered off in width, from 9 meters to 6 meters at Barangay Maug where the levee unceremoniously ends.

The water pumps in the downtown area on the west bank, particularly at Agao were not installed soon enough to drain out collected rainwater even during non-typhoon seasons to prevent flooding.

The floodgates and sluices were not designed to prevent vandals and thieves from compromising the steel equipment that were stolen and sold as scrap metal.

The west bank levee fell short from reaching the coastline at Lumbocan. The experience with TD Agaton showed that the floodwater from Agusan River inundated the protected area by flowing back through a low elevation at the end of part of the west bank levee and into the Agusan Pequeño River as shown in Figure 46.

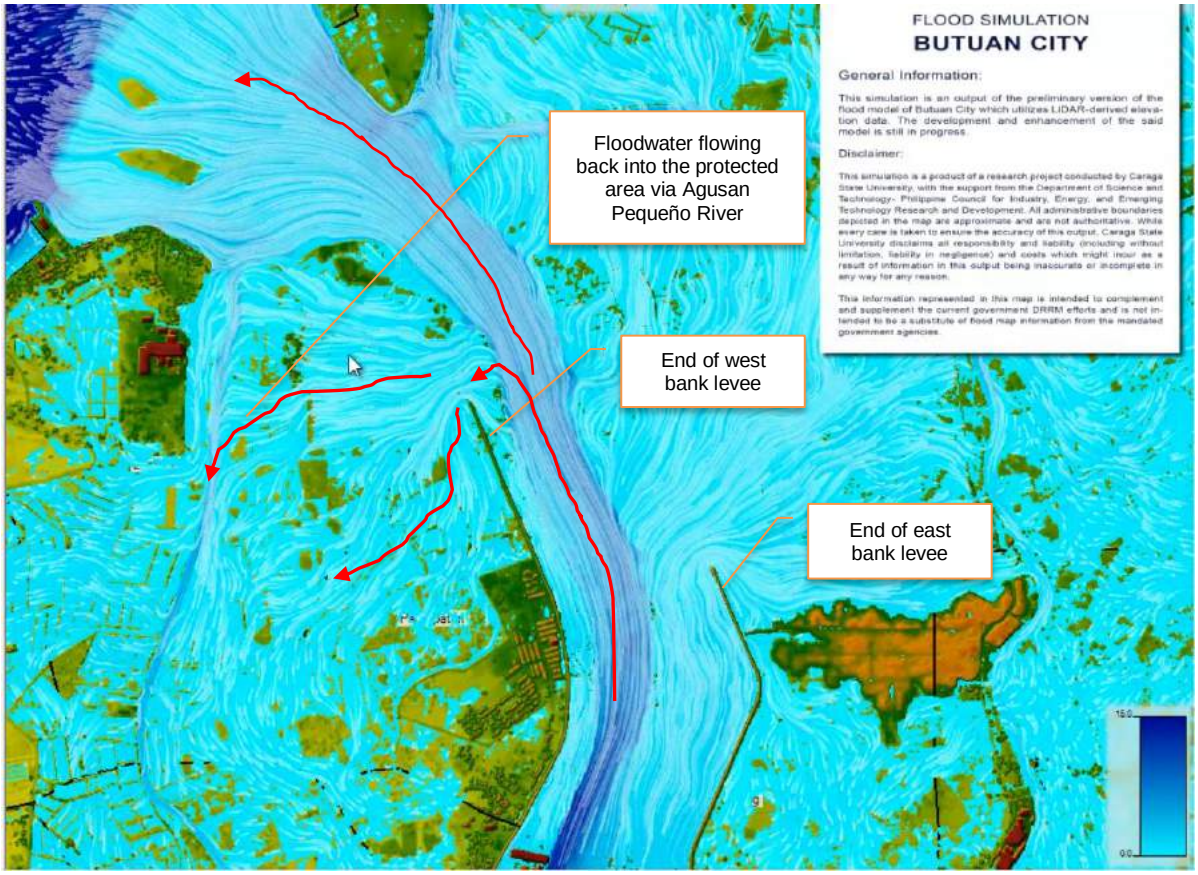


***Figure 43**. Simulation of 100-yr rain return showing floodwater from Agusan River. Geo-SAFER Mindanao.*

According to PMO, the failure in the acquisition of land for the final section of the east bank levee was due to the refusal of the fishpond developers and residents who will be affected by the construction of the levee. This simply shows that the PMO did not exercise due diligence in pursuing the land acquisition. The PMO can expropriate land affected by projects for public use. Government has eminent domain and can resort to expropriation proceedings for the acquisition of land, even titled land properties with improvements, provided government exercise due process of law and due compensation.

Another project gap is the failure of the east bank cut-off channel to effectively drain the outfall at Brgy. Mahay, Lemon and Tagabaca. The project was implemented shorter by 1.5 kms from the present start point due to right of way problems that prevented it to reach the creeks at Brgy. Mahay and Tagabaca, which would have prevented the inundation of the rice, lots in the area when the

creeks overflow. During ordinary rainfall, the runoff water drains through a sluice that passes underneath the levee and into the Agusan River. This is not ideal when the water level at Agusan River rises higher than the drainage outlet wherein the floodgates will then be closed, leaving the outfall in the protected area to stagnate until it reaches a certain level to reach the ingress or start point of the east bank cut-off channel and drains into Butuan Bay.

2. Project Delays

FC Phase 1 was delayed 74 months, while FC Phase 2 was delayed 51 months. Delays were due to changes in original scope, economic crisis during construction, negative reactions from residents, Right of Way issues, and others.

Through the efforts of the ICC, it enforced the lessons learned in FC I as pre-condition in the implementation of FC II, such as the strict selection of contractors, ROW, resettlement issues, and the participation of the LGU.

Project implementation exceeded the time frame to 172% less than 31% of the FC I experience. Emergence of ROW related problems led to 8 variation orders and 4 supplemental agreements due to additional scope. The demand of the local government for an Overall Resettlement Area (ORA) including land development and construction of basic facilities became an added burden to the project. In terms of cost, the ROW increased by 209%, Civil works by 82% and consultancy by 47%[7].

Unlike other projects where its purpose and objectives are achieved immediately after completion, the LADP Flood Control and Drainage Component has yet to affirm its efficiency and effectiveness of its purpose in response to a calamity it is designed to handle.[8] The project was designed to contain flood at 8,000 cumecs, as of the evaluation time, the highest recorded flood of Agusan River was caused by TD Agaton in 2014. During this event 1,168 mm (46 inches) of rain was recorded January 10, 2014 that breached the designed maximum flood level leaving only the freeboard allowance of 1.5 meters between the flood level and the top of the concrete floodwall protecting the City. The real test has yet to come.

Resettlement Sites

The resettlement component of the project shows a lack of a cohesive relocation plan. The acquisition of lands was delayed by eight years due to road right of way problems. The overall size of the resettlement areas was affected by the acquisition cost. Development of the sites was delayed as well. Resettled families in Brgy. Pagatpatan are seeking amendments on the Terms and Conditions in the Award Certificate issued by the City Housing and Development Office, particularly the monthly payments for the house and lot ranging from P280-550 per month for 20 years. Many awardees are unable to pay due to poverty.

The Pagatpatan relocation site is found to be in an earthquake fault as shown in the geologic map of Butuan City where the whole barangay is within a strike-slip fault, and the grounds are in danger of liquefaction as shown in the Hazard Map of Butuan.

Summary of Gaps During Project Implementation

a. Project Planning

The project planning stage of the LADP FCC consisted of two major stages: the Feasibility Study (1980-1981), and the Detailed Design (1982-1983) that took about two years each to accomplish.

[7] ICC-TB. Memo 27 April 2005

[8] Engr. Edgardo T. Sanchez, Former City Engineer. (March 2018) Key Informant Interview

b. Project Implementation

FC-I, which was implemented earlier in 1988 was planned to be accomplished within 72 months (January 1988 to December 1993) but the work dragged on until February 2000. Major reasons of the delay were:

i. Delays in the selection of the consultant and contractors (22 months);
ii. Poor performance of contractors resulting in a 3-year litigation and work suspension;
iii. Right-of-Way problems;
iv. Resettlement issues.

The resettlement was implemented in 1996, halfway in the project implementation of FC-I.

c. Project Monitoring and Evaluation

In the project evaluation report of FC-II (July 1996), all of the concerns mentioned above were included as main points for consideration, namely

i. Procurement
ii. Smooth implementation and minimizing the probable Damage Risks
iii. Close coordination with concerned agencies
iv. Land Acquisition and compensation
v. Resettlement
vi. Flood Forecasting and Warning Systems (FFWS)

To strengthen these main points, the ICC Secretariat issued a memorandum to the ICC bearing these conditions[9] (Annex 3)

i. For DPWH to secure a Memorandum of Agreement with LGUs indicating the latter's firm commitment to the implementation of the project specifying the activities and resources the LGU will make available to the proponent to ensure the successful implementation of the project.
ii. That the project's Right-of-Way (ROW) acquisition plan reflecting the LGUs responsibility for the ROW acquisition.

These were off-shoot from the experiences in FC-1 implementation, which were introduced as improvements of the second phase.

After the loan agreement was signed on March 1997, the Design Review of FC-II was conducted that lasted until 1999.

Tabble 26 shows the project stages indicating the planned timeframe to accomplish it and the actual date it was accomplished.

***Table 26**. Planned and Actual Project Implementation*

Project	Planned	Actual	% of Plan
1. FC I	Jan. 1988 – Dec. 1993 (72 mos.)	Jan. 1998 – Feb. 2000 (146 months)	203 %
2. FC II			
a. CP I	Jun. 28, 2003 – Nov. 25, 2005 (29 mos.)	Jun. 28, 2003 – Oct. 12, 2006 (40 mos.)	138 %
b. CP II	Apr. 2, 2004 – Jul. 3, 2006 (26 mos.)	Apr. 2, 2004 – Aug. 30, 2007 (40 mos.)	154 %

[9] ICC Memo,16 July 1996

Project	Planned	Actual	% of Plan
c. CP III	Mar. 28, 2000 – Jan. 27, 2004 (46 mos.)	Mar. 28, 2000 – Aug. 13, 2004 (53 mos.)	115 %
d. CP IV	Apr. 14, 2001 – Feb. 11, 2004 (34 mos.)	Apr. 14, 2001 – May 31, 2010 (109 mos.)	279 %
3. Consultancy Services	December 10, 1997 – June 10, 2005 (90 mos.)	December 10, 1997 – September 3, 2006 (101 mos.)	112%

Source: Lifted from JICA 2010 Ex-post Evaluation Report

3. Operation and Maintenance Gaps

The Floodway

The Agusan River floodway is the most vital component of LADP in achieving its primary objective in mitigating damages and losses of life and property caused by flood. Its effectiveness in attaining this goal depends greatly in the efficiency of conveying the anticipated huge volume of floodwaters passing through Butuan City. The floodway is approximately 1,280 hectares from its start points at Bit-os (west bank) and Aupagan (east bank) up to its end points at Pagatpatan (west bank) and Maug (east bank).

Floodways are hazard zones as these areas are underwater during a flood. The Agusan River floodway is specifically designed for a specified flood volume. As such, no human habitation should have been allowed within the area including activities of commerce, education, public services, utility services and others. As of this study, the Agusan River Floodway has several large industrial plants, commercial establishments, school building compounds, residential houses and other man-made improvements that would constrict and obstruct the flow of floodwaters towards Butuan Bay. The uncontrolled and unabated proliferation of man-made structures pose great danger to life and property and increase the risk of the floodwall being over-topped with floodwaters. Neither the Sangguniang Panlungsod nor the Local Chief Executive (past or present) has passed a resolution or executive order declaring the floodway as a no-build zone to cease the influx. There are about 24,131 people living in the floodway.

In addition, a 3-meter high structure stretching 800 meters long is being constructed on the west bank that encroaches about 45 meters from the floodwall below the Magsaysay Bridge, the narrowest portion of the river. In 2010, the Millennium Development Goal Park Project was constructed at a portion of that area but was discontinued because it was found to constrict and obstruct the floodway. The LADP Feasibility Study (1981) cited the same area as “The Magsaysay Bridge, spanning the Agusan River at Butuan City forms a constriction to flood flows. Its approach on the east right side forms a barrier that hinders flood flows and prevents the proper drainage of this east bank area” (FS Report, June 1981).

In addition to the residential structures of varying materials, there are commercial and industrial buildings constructed in the floodway as mentioned earlier. The LADP PMO said that the river had become shallow due to silt, sediments and other debris resulting from uncontrolled mining, quarrying, erosion and other activities upstream. These are transported downstream by flood and deposited to the whole stretch of the river particularly at the tip of Agusan River at Brgy. Masao-Lumbocan Area. The river mouth has become shallow and the floodwaters are being obstructed from discharging to the sea raising the water level upstream especially during high tide.

A comprehensive utilization plan on land use of the floodway is necessary to redefine its usage in times where no floods occur after the area is cleared. It is repurposing the floodway. It can serve economic purposes including prospects for new investments. Seasonal crops (rice, corn, others) can be farmed in the area. Recreational and leisure spots can be set up as long as it does not entail the construction of buildings like golf courses, board walks, parking areas, or camp grounds.

Cut-off Channel and Improvement of Rivers

Efficiency of the cut-off channel, Libertad Masao River, Sosompit Creek and other open canals is reduced due to vegetation, garbage and silts attributed to low maintenance which is now lodged solely to LADP-PMO. Extensions and improvements of the drainage systems divide the attention of the office from the operations and maintenance needed by the project structures.

During implementation stage, Masao River, because of its proximity to the mouth of the Agusan River at Brgy. Lumbocan, the high level of flood waters at the mouth flows back through Masao River preventing the run off from the urban area to drain out through Masao River out to sea.

Memorandum of Agreement of LADP Turnover

DPWH and LGU-Butuan executed a MOA for the turnover of completed structures and subsequent maintenance. LGU-Butuan was not ready to assume full responsibility for reason of budget constraint. The MOA was amended in 2012 specifying a short list of LADP projects LGU-Butuan accepts. It was limited to the completed Urban Drainage System consisting of the Creeks and Drainage channels with all the sluices, drainage pipes, box culverts and road pipe culverts. The MOA delineated the specific duties and responsibilities of both parties in the maintenance and operations including that of the Resettlement Sites.

The gap was when DPWH PMO turned over the projects the LGU without a transition phase. Other OECF-funded projects carries out a transition period where the beneficiary is taken to task to become familiar with the project before the actual turnover.

V. FLOODING SIMULATION MODELS

The study made by Geo-SAFER Mindanao - Agusan Project, Caraga Center for Geo-informatics, College of Engineering and Information Technology, Caraga State University, Ampayon, Butuan City has a remarkable output in its paper through the mapping and assessment of existing flood control structures of LADP. The study used LiDAR[10] topographic datasets and flood simulation models that provided the impact assessment with insights on the extent of the effectiveness of the flood control structures in the occurrence of heavy rainfall brought about by a “Tail-End of a Cold Front" event in 2017.

Figure 47 shows a comparison of two 2-dimensional simulated images[11] reflecting the effects of a heavy rainfall occurrence with a estimated flood level of more than 1.5 meters “without the FCS” and “with the FCS”.

Based on the results, the City of Butuan will experience minimum flooding even with the presence of FCS in the event of extreme and heavy rainfall events.

Overall, the flood mitigation measure is still effective as it decreases an approximate area of 9.05 km^2 of flood extent in the city, according to the Geo-safer study, and further concludes that the city has huge advantage as FCS lessens and mitigates the extent of flooding in the community.

[10] LiDAR - stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth.

[11] The LiDAR-derived data utilizes Digital Terrain and Surface Models (DTM & DSM) to extract and map existing flood control structures along the Agusan River in Butuan City area.

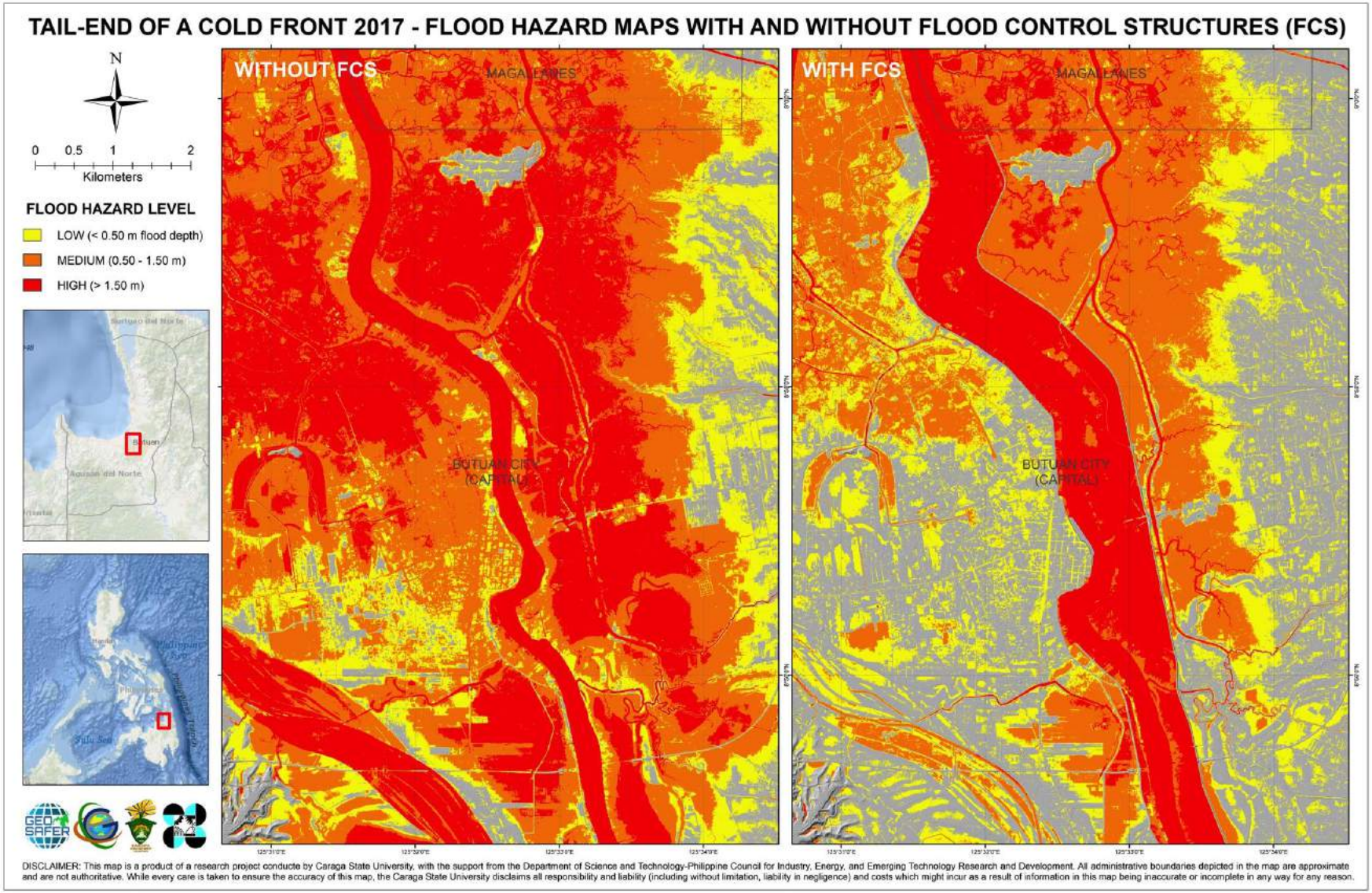


Figure 44. *Flood extent without and with the FCS*

VI. LESSONS LEARNED

1. Right of Way problems caused an increment of 667M on land acquisition cost and influenced the change in scope resulting to additional works and modifications of the original design which caused the increase in cost by P 1,304.8 m. In addition, ROW caused the delay in the implementation with the time incurred in the technical preparation (ICC Secretariat Memorandum to ICC – Cabinet Committee, 29 July 2005).

   ROW issues should be resolved before project implementation, preferably after F/S and the latest after D/D. Formal agreements from the landowners acquired before fund disbursement.

2. Initial inventory of HH affected by the construction of the structures of the LADP – Flood Control Component was 4,015 (3,600 from FC I and 415 from FC II). However, after the 1999 flood, before FC I was completed, the number of affected families rose to 5,901 (3,509 HH in the east bank and 2,392 in the west bank). This became as the bench mark of LADP in estimating the number of lots to be prepared (Engr. Mulawan, K II) as resettlement areas of the relocatees.

   The LADP – Office provided listing of lots acquired consisting of 72 lots with a total area of 1,436,275 (143.63 has) sq. m. but only 1,166,358 sq. m. (116.6354 has) developed by the LGU. As of 2018, the number of lots developed was 3,674 (with lots area ranging from 80, 96 and 120 sq. m) and out of these, only 2,606 were awarded while 1,068 were still vacant. (Attached Status of LADP Resettlement Areas).

   Resettlement should be undertaken under the project and corresponding cost should be included in the project cost.

3. Operations and Maintenance of infrastructure projects is lodged with the LGU for sustainability, in this particular case the flood control facilities. LADP's project structures straddle along the national highway and jurisdiction of the LGU. It was the initial agreement of the implementing agency. DPWH and the Local government of Butuan that portions of the project structures within the jurisdiction of the LGU be turned – over to the city for the O & M, including the transfer processes of documents, ownership, O & M manual and necessary equipment. Those within the national highway will be retained by DPWH.

   Deficiencies in the process resulted to ineffective O & M due to insufficient budget allocations by the city. A more binding document that transcends changes in local leadership to ensure continuous commitment by the LGU, authorized by the city council should have been required.

   Similar cases in future project implementations should be addressed by the LGUs as provided for in the Local Government Code in Section 524, Inventory of Infrastructure and Other Community Facilities, to wit:

   > **"**- (a) Each local government unit shall conduct a periodic inventory of infrastructure and other community facilities and undertake the maintenance, repair, improvement, or reconstruction of these facilities through a closer cooperation among the various agencies of the national government operating within the province, city, or municipality concerned."

   The reluctance of the LGU to enact a resolution for the "no build zone" policy of the project in the floodway resulted to the return of affected residents and influx of more settlers. ANECO reported that there were more than 5,600 residential electrical connections are within the floodway including commercial and industrial connections.

   References regarding areas that prohibitthe building of structures are stated in the following legal documents:

   - Civil Code (RA 386)
   - Water Code (PD 1067)
   - National Building Code (PD 1096)
   - Forest Code (PD 705)
   - Philippine DRRM Act of 2010 (RA 10121)

VII. CONCLUSIONS

The DPWH LADP Theory of Change defines the desired impact of the LADP Flood Control Component project as ***Increased development potential of the region by protecting Butuan City and its surrounding areas from flooding***.[12] An examination of the expected outcomes which are deemed necessary to bring about the desired impact will lead us to conclude that not all of these outcomes have been completely accomplished by the project.

The LADP Theory of change describes the necessary physical outcomes, to wit: Butuan City is free from the menace of flood waters as a result of waters from the basin flowing within the floodway into Butuan Bay, Local rainfall will be drained by the East Bank cut-off channel through the improved Banza River, Local Rainfall in the downtown area will drain through the improved Urban Drainage System via Masao River into Butuan Bay.

An inventory of the completed LADP flood control infrastructures are as follows: An earth embankment levee on the east bank. A reinforced concrete floodwall on the west bank parallel to the Agusan River preventing floodwater from entering the Butuan City proper. On the east bank, the earth levee is 12.1 kms long and the cut-off channel is 6.2 kms long (including improvements of creeks and small rivers). On the west bank, the floodwall that traversed the former downtown area is 4 meters high from the ground and 5.4 kms in length which provides protection to the commercial business district. The floodwall is connected with earth levees at both ends. The earth levees are at 4 meters high with an aggregate length of 10.3 kms, thus a total of 15.7 kms of flood protection.

Flood mitigating measures for run-off water outside the floodway are addressed through the improvement of the urban drainage system and the construction of cut-off channels. On the east side, local rainfall is drained by the 6.2 km cut-off channel from Mahay into the improved Banza River and finally into Butuan Bay. On the west side, which is the downtown area, the local rainfall is drained through the improved Urban Drainage System and finally into Butuan Bay via the improved Masao River and Agusan Pequeño River.

In sum, the FCS has protected an area of approximately 294.72 km2 on both sides of the Agusan River. A total of 46 barangays (out of 86 total barangays of Butuan) directly benefit from the flood control structures and improved urban drainage system. In terms of population, the east bank levee provides flood protection to approximately 10,830 households with a population of 45,161 individuals. On the west bank, there are about 1,500 business establishments that benefitted from the FCS, and approximately 14,377 households with 68,580 residents. The improved Urban Drainage System benefitted 18 barangays covering an area of 66.76 km2 with a population of 106,481 in approximately 25,535 households. The total population that directly benefit from the flood control and improvement of urban drainage systems represent 66% of the total population of Butuan City.

Along with the physical outcomes, the LADP Theory of Change stipulates other non-physical outcomes as follows: Confidence to invest or expand existing businesses, Decreased Poverty Incidence and improved living conditions, and that the residents in the directly affected areas are living in the resettlement sites.
Along this line, positive results are observed from several socio-economic indicators as follows:
Butuan City Business Registrations increased from 6,772 in 2010 to 9,707 in 2016 with a total capitalization of Php 3,518,697,554.61 in 2010 and Php 7,711,311,847.71 in 2016. Likewise, a 150% increase in Approved Building Permits from 805 to 2,156 units from 2005 to 2015, respectively with an accumulated number of 23,539 units during the period covered. A report from the City Planning and Development Office shows that the LGU has developed 427.929 hectares into 120 subdivisions, while private developers have constructed 142 subdivisions involving 547.602 hectares. These are all within the 46 flood control influenced barangays.

The Philippine Deposit Insurance Corp. (PDIC) reported that total bank deposits in the city increased from Php 13.15B in 2012 to Php28.506B in 2018 registering a 116.8% increase in a matter of 8 years. Over the same period, land use and valuations also registered substantial increases.

[12] p.3 "Objectives of the Flood Control", LADP Design Report, Vol.1 – Flood Control, Ministry of Public Works and Highways, October 1983. Nippon Koei Co. Ltd., Nikken Consultants, Inc, Technosphere Consultants Group, Inc.

In 2014, the local city income reached P513,870,000.00 or registered a growth rate of 55%; and total income (including IRA) was P1,515,970,000. Butuan City was ranked 4th and 16th Most Competitive City for the years 2012 and 2014, respectively, by the National Competitiveness Council of the Philippines.

With regard to individual income and employment, data provided by City Planning and Development Office shows that unemployment stood at 11.5% of total labor force in 2015. Further, average annual HH income in 2018 was P189,000/family or a per capita income of P31,500 (based on an average of 6 members per HH) while the per capita poverty threshold was pegged at P18,905 and P21,535 for 2012 and 2017, respectively.

With regards to the general well-being of the affected population, data from the City Health Office of Butuan shows a decreasing trend in the incidence of water borne diseases. Reduced instances of water borne diseases were also reported by 89.6 % of the survey respondents. The dwellings provided in the relocations sites also provided better living facilities than the original houses of the resettled population.

The LADP has also brought about unplanned benefits. The levees have become part of the city's road network. The east bank, which was originally designed with a crown of only 6 meters, upon the intervention of the LGU and which DPWH acceded favorably, it was widened by 1.5 meters on each side having a final crown width of 9 meters. On the east bank, the levee's crown remained at 6 meters, although a bit constricted; it is used as an important access road.

The LADP project has also brought about unplanned outcomes that have resulted to unexpected impacts on the city's economy and the population's well-being. For instance, based on the CLUP 1997-2010 a shift in the concentration of population as well as land use can be observed among and in between different barangays particularly between traditionally classified as urban barangays and rural barangays. Out of the 27 barangays classified as urban (CLUP 1997-2010) 18 barangays experienced negative population growth. The decline in population from these barangays in the commercial district can be attributed to a number of reasons. Those living in the floodway have finally transferred to the resettlement sites. Others have left the place due to city road expansions affecting their houses, residential units have become commercial buildings, and others transferred to one of the new subdivisions due to the worsening parking problems on very narrow city streets.

On the other hand, the other 19 barangays classified as rural (CLUP 1997-2010) showed an increase in population by 57% (84,884 in 2000 to 133,293 in 2015) led by Brgy. Pagatpatan (262%), Villa Kananga (201%), Mahay (142%), and San Vicente (98%). Pagatpatan, San Vicente and Mahay are resettlement areas of project affected residents. Villa Kananga, Ambago, Bit-os, Baan Km3 and Doongan have become primary choices of property developers for new subdivisions and individual housing units.
When compared with the list of outcomes specified in the LADP Theory of change, the following can be identified as the project gaps:

The first glaring unrealized outcome is that several residents in the directly affected areas are still living in the floodway instead of in the resettlement sites. The estimated population within the floodway is 24,131 which is equivalent to 5,786 households. This is collaborated by the data from ANECO which indicated that it had 5,656 connected customers within CARBDP-LADP floodway including 5,429 residential houses. In the field survey, there were three (3) HH out of 384 sampled within the floodway have no electric connections. These structures impede the flow of the floodwaters along the floodway towards Butuan Bay.

There were structural gaps in the FCS particularly on the east bank earth levee where the crown width tapered off from 9 meters to 6 meters at a length of 1.64 kms towards the end section at Brgy. Maug. The study found that the east bank cut-off channel have failed to reach the creeks that was supposed to drain the runoff water into Butuan Bay, independent of the Agusan River Floodway. LADP PMO said that a right of way problem prevented the east bank cut-off channel to reach that critical area which is 1.5 kilometers away from its present upstream starting point. The farmers were saved from floodwaters coming from Agusan River but not from flooding caused by heavy local rainfall.

On the west side, communities near the floodwall continue to suffer flooding caused by rainwater and run-off unable to be drained by the project's urban drainage system due to its much lower elevation of the streets. Vandals and thieves have stolen the sluices and flood gates which were sold as scrap metal. There were no protection measures installed. Some parts were recovered by DPWH PMO with police assistance. The west

bank levee did not reach the coastline at Lumbocan. This gap has caused floodwaters from Agusan River to flow back into the protected area through Agusan Pequeño River where a floodgate should have been installed.

Aside from these physical gaps, the LADP project implementation was also affected by several factors which significantly affected the accomplishment of the desired outcomes as defined in the LADP Theory of Change. According to DPWH PMO, the issue on the Right-of-Way was the major obstacle in the implementation of the project. ROW-related issues caused the redesigning of the structures and work stoppages. This entailed additional works and increase project costs notwithstanding a delay due to litigation proceedings with a contractor and changes in foreign exchange rates. LADP was implemented with an increased cost which is higher by 99%, and completion time longer by 187%.

Apart from this, there are serious issues in the area of coordination and cooperation with stakeholders, particularly the LGU of Butuan which is the main beneficiary of the project. The project was turned-over to Butuan LGU by DPWH in 2007. A MOA, later amended, defined the operation and maintenance responsibilities of the LGU. However in 2014, per advice of the OECF and GOP, the O & M responsibilities were entrusted to DPWH District Office in Butuan City after the LGU was found remiss in its obligations in the MOA. Appropriate recommendations by the study team are found on the recommendation section of this report which should deepen the LGU's ownership and ensure sustainability of the project.
Based on the aforementioned considerations, ***it is safe to conclude that the LADP Flood control Component has substantially accomplished its desired impact.***

In terms of project relevance, the overall welfare of the people in Butuan City and the prevailing positive economic indicators exemplifies the attainment of the LADP objectives. The counterfactual study conducted has demonstrated the net impacts, that more than ever, Butuan City needs the infrastructures. Although, the LGU's budget for the operations and maintenance of the facility is negligible, it does not in any way reflect a total lack of interest but rather a pragmatic strategy of sourcing funds for this component of the project. As case in point is the city's enthusiasm in the resettlement component of the expected outcomes.

In terms of project Efficiency, Based on the 1983 Detailed Design, about 80% was implemented at the project closing date on February 26, 2007. FC Phase 1 was delayed 74 months, while FC Phase 2 was delayed 51 months. Delays were due to changes in original scope, economic crisis during construction, negative reactions from residents, Right of Way issues, and court litigation. The resulting implementation gaps, i.e. cancellation of the Urban Drainage Improvement projects, shortening of the west bank levee and east bank cut-off channel, have affected the attainment of the desired project outputs.

The effectiveness of The Flood Control Structures in adequately protecting Butuan City from both the flood waters from the watersheds upstream and seasonal floods brought about by run-off water during heavy rains within the city is not 100 percent due to the problems relating to the unfinished Urban Drainage Improvement project and the unfinished levees and cut off channel in the east side. Project completion of the physical gaps will make the project fully effective.

The very positive impact on the local economy is evident from the several socio-indicators examined which support the existence of a general confidence to invest or expand existing businesses among business entities. There is also a general increase in family income and a corresponding reduction of Poverty Incidence and improved living conditions among the populace.

Sustainability of project's positive outcomes are likely to continue due to the on-going construction activities undertaken by DPWH in order to complete the project as originally designed. When completed, these additional on-going activities would have contributed another 15% towards the flood control components final completion, from 80% (2007) to 95% by (2019). One foreseen inhibiting factor towards achieving sustained outcomes is the LGU's lack of ownership stance towards the acceptance of the project being the primary beneficiary. These sustainability issues are properly addressed in the recommendations proposed by the consultants.

VIII. RECOMMENDATIONS

To broaden the impact of the flood control project, here are measures and recommendations for further development, utilization, and addressing the gaps identified.

A. INFRASTRUCTURE

1. 100% completion of the project as planned.

LADP projects that DPWH have completed since 2007 and the ongoing projects cover about 15% of the unimplemented projects. DPWH shall have covered 95% of the design upon completion. The remaining 5% of unimplemented projects shall be given priority by the DPWH.

A matrix that presents the cost of Completed Projects after project turn-over, Ongoing Projects and Proposed Projects to complete the LADP as designed will be supplemented pending the submission of said data from LADP PMO.

2. Construction of the other West bank cut-off channel

The construction of the West Bank cut-off channel connecting the man-made channels in Maon and Villa Kananga to Bonbon River - Bancasi River - Libertad River to Masao River and drain directly to Butuan Bay independent of the Agusan River Floodway.

3. Restoration and Improvement of drainage canal along Montilla Blvd.

The drainage canal at Montilla Boulevard in the commercial area should be restored and improved by removing the obstruction therein including the earth and gravel filling materials and the removal of the installed undersized culverts inside the trapezoidal drainage canal.

4. Restoration/Reinstallation of Missing Sluice gates

A total of 33 Urban Drainage Sluice steel gates were stolen. There is a need to restore these gates to prevent the constant sea water intrusions during high tide.

5. Dredging of the Agusan River

Silt and other materials transported from upstream over the years have made the river shallower.

The dredged spoils can be used to build a collateral reclamation area in Brgy. Lumbocan, the city's new industrial zone, containerized port or transshipment distribution center, which is adjoining the International Sea Port in Brgy. Masao currently under development stage.

This will require a feasibility study and a development plan. No less than 150 hectares can be reclaimed beside Masao Port for this purpose. A bigger back-up area for the spoils can be dumped at Brgy. Masao.

6. Upper East Bank cut-off channel

To prevent a similar flooding incident at Brgy Ampayon in 2016, there is a need to construction of an Upper East Bank cut-off channel connecting Ampayon River, Tiniwisan River, Banza River draining directly to Butuan Bay thru Brgy. Guiasan without connecting to the Agusan River.

7. The East Bank Drainage Rivers affect rice fields

The East Bank drainage rivers should be investigated and improved to protect the vast farmlands in Brgy. Taguibo, Butuan City and to the Municipality of R.T. Romualdez and a portion in Cabadbaran City are being ravaged by floodwaters. Its outfalls or water discharge should be contained to avoid flooding of areas upstream. The flood discharges of these rivers should be diverted away from Agusan River.

8. Design Review of the Agusan Pequeño River drainage channel

The Agusan Pequeño River Drainage Channel drains directly to Butuan Bay. Its mouth is about 800 meters away from the mouth of Agusan River. This river as a flood control component should be reviewed. The river is fed by Langihan Creek, Doongan Creek and local runoff water during heavy rains. It was observed that during annual floods, the floodwater flowing from the Agusan River into Butuan Bay is of higher volume and elevation which blocks the outflow from this drainange channel and even results to a backflow into the protected area.

9. Extension of Levees

The East and West bank levees should be extended from its current end points. A flood simulation made by Geo-SAFER Mindanao showed that the occurrence of a 100-yr rain-return will allow a reflow of flood water from the floodway into the protected area via the end points of the levees. The west bank levee should be extended by about 2.29 kms into Brgy. Lumbocan, while the east bank levee should be extended by at least 3.39 kms towards the Banza River cut-off channel.

10. Protection of FCS facilities

Floodgates and sluices should be protected to prevent vandals and thieves from stealing the metal parts as scrap iron.

Barangay officials where the structures are located should provide security to protect the facilities.

11. Desilting of the main drainage canals and creeks

Silt and other materials have accumulated over the years reducing its water handling capacity.

B. POLICY LEGISLATION

1. The Sangguniang Panlungsod should pass a resolution declaring the floodway as a “No-Build Zone” to stop the proliferation of new structures from being constructed within the area. The yearly financial losses incurred by the City Government evacuation costs and loss to property, can be mitigated by the passage of this resolution and its strict implementation. Other cities have passed resolutions and have implemented this as in the case of Metro Manila, Davao, Iligan, Cagayan de Oro and Cebu cities. While the passage of this resolution may appear to cause resistance from the dwellers in the area, the financial losses not to mention the possible loss of human lives outweigh this. This will require strong political will to enforce the said resolution.
2. The Sangguniang Panlungsod should pass a resolution for the full acceptance of the project and a provision for the allocation of funds for maintenance purposes. The project clearly benefits the city and as it should, the Sangguniang Panlungsod, fully accept the project. This will require additional financial resources from the City Government to support the regular maintenance of the flood control structures. The funds can come from other available funding windows that carry concessionary rates and repayment terms.

C. RESETTLEMENT SITES

1. A review of the guidelines in allowing families to avail of the lots intended for directly affected residents. There are families living in resettlement sites who were not affected by the project but "assumed" the amortization as successor-in-interest of the house and lot from a beneficiary who has left the area.

2. The roads leading to and within the sites and drainage system must be improved or rehabilitated in preparation for the new wave of families who will resettle should the floodway clearing is enforced.

3. Livelihood intervention from LGU Butuan for families in the resettlement areas.

D. SOCIAL CONCERN

1. The floodway is a danger zone. There is an estimated 24,000 people living within the floodway on both sides of the banks who are at risk. Floods come far in between, the reason people continue to live and work in the area. There are large industrial plants, commercial establishments, warehouses, schools, residential buildings and other structures that are improved, fortified and extended over the years. In 2014, TD Agaton brought the water level to nearly breach the floodwall and levees even if the volume was estimated to be less than the 50-year rain-return but the water level was high due to the obstructions in the floodway. Technically, Butuan City is already protected from flood water from the Agusan River except in the floodway where residents are evacuated or rescued, risky and costly activities, in times of rising waters during monsoon seasons.

   There is a need to clear the floodway of structures as these obstruct and constrict the flow of floodwaters. The obstructions is bound to compromise the integrity of the structures which was designed to confine a pre-determined volume of water to flow without obstructions. The floodway must be clear from any obstructions. This is a declared policy of DPWH.

   The clearing plan must take into consideration the following:

   a. A comprehensive evacuation plan that is thoroughly thought out.

   b. A revitalized resettlement plan. There are LADP-acquired resettlement areas that are still available to relocate affected residents. The 70-hectare spoil bank yard, which is part of the original loan agreement, can be used as resettlement site. A large area at Brgy. Guiasan is still available that needs further development for resettlement purposes.

   c. No business permits will be given to businesses that expand in the area and the business establishments operating there must be encouraged to look for other areas for relocation. This must be made into a policy and enforced by the City Government.

E. FLOODWAY UTILIZATION PLAN

1. Conduct a study for a comprehensive land use plan of the floodway that will bring to full utilization of the 1,280-hectare property during times when no floods occur without constricting the floodway and endangering life and property.

F. ROLE OF STAKEHOLDERS (LGU, DPWH and other concerned agencies)

1. **Cross-Sector Coordination between LADP-PMO and LGU Butuan**

   It is recommended that LADP-PMO and LGU Butuan should resolve the issues that have emanated since project turn-over.

   The Cross-Sector coordination is suggested to be facilitated by the RDC – Infrastructure Development Committee of NEDA-13 that shall act as Secretariat.

2. **LGU-DPWH collaboration for maintenance**

LGU-DPWH should consider the creation of an office for Operations and Maintenance of the LADP structures as part of the sustainability mechanism.

G. FINANCIAL

1. The need to determine the funding requirements for cost sharing to finance the recommended plan of action and other recommended programs and projects. The financing requirements may be substantial and as such can be supported by other financing windows with concessionary rates and repayment terms.

2. The City Government may consider tapping these sources of financing:

Local Development Fund

Under the Local Government Code, the LDF or the Local Development Fund can only be used for projects that are included in the Local Development Plans (Comprehensive Development Plan and the Comprehensive Land Use Plan). As mentioned, most LGUs are hard pressed in prioritizing their development needs given their high poverty levels and continued environmental degradation.

Local Disaster Risk Reduction Management Fund

The LDRRMF or the Local Disaster Risk Reduction Management Fund is focused on financing disaster risk reduction management concerns. This accounts for 5% of the regular General Fund income. This is fund is for the support disaster risk management activities such as disaster preparedness programs including training, purchase of disaster response and rescue equipment, supplies and medicines, for post-disaster activities and premium payments on calamity insurance. The projects that will be supported by the LDRRMF should be incorporated in the Local Disaster Risk Reduction Management Plan (LDRRMP) and integrated in the approved annual investment program of the LGU.

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X. APPENDICES

ANNEX 1

1. Historical Population of FCC Influence Area Urban Barangays based on BC Classification

Barangay	1980	1990	2000	2010	2015
1.Agao	1356	1228	1174	862	778
2.Baan Riverside	3225	5565	6118	5611	5376
3.Bading	1767	4,496	5110	5384	4921
4.Bayanihan	706	3032	4070	4242	4599
5.Buhangin	2752	3858	4946	4606	4407
6.Dagohoy	1523	1851	1723	1365	1177
7.Diego Silang	2148	1809	1530	1246	908
8.Golden Ribbon	4338	4774	5267	4484	3833
9.Holy Redeemer	4597	5505	6642	6813	7267
10.Humabon	697	564	328	157	137
11.Imadejas	1077	1673	1761	1788	1954
12.Jose Rizal	2158	5588	4730	5327	5036
13.Lapu-lapu	2206	1990	1649	1132	1135
14.Leon Kilat	471	694	536	137	163
15.Limaha	6130	7739	8122	6719	6301
16.Maon	2423	3114	3724	4956	5072
17.Mahogany	1860	2880	3749	5111	5218
18.New Society Village	1558	1600	1343	1128	1481
19.Obrero	4903	6900	8240	8906	9774
20.Ong Yiu	5249	6168	5398	4580	4859
21.Port Poyohon	2936	6358	5221	5759	4798
22.San Ignacio	4064	4238	3175	2532	2637
23.Sikatuna	812	596	533	102	43
24.Silongan	1185	1316	1045	692	661
25.Rajah Soliman	1060	927	701	527	465
26.Tandang Sora	3396	4961	4201	3975	3846
27.Urduja	746	596	594	107	83
Total	65,343	90,020	91,630	88,248	86,929

Source: PSO XIII and CPDO, Butuan City

ANNEX 2

2. Historical Population of Flood Control and Urban Drainage Systems Influence Barangays

Barangay	1980	1990	2000	2010	2015
1.Agusan Pequeno	4486	4189	4371	4865	5070
2.Ambago	1231	2403	7138	10,901	12,656
3.Aupagan	1445	1371	1606	1597	1660
4.Baan km 3	2602	3910	7108	10,812	11,308
5.Babag	1058	1362	1716	1651	1823
6.Banza	1970	2526	2961	3349	4235
7.Bit-os	1369	1865	1916	2635	3166
8.Bonbon	2144	2569	3774	4538	5446
9.Doongan	1747	4600	8716	13,689	13,728
10.Libertad	7370	11,762	17364	21,760	21,703
11.Lumbocan	3177	3890	4235	4015	4462
12.Mahay	1594	1902	1674	2860	4062
13.Masao	1041	1292	1514	1607	1786
14.Maug	2111	2368	2331	2573	2778
15.Pagatpatan	-	1344	1638	4399	5933
16.Pangabugan	-	2088	2574	2770	2630
17.San Vicente	3647	4266	8159	13,326	16,187
18.Tagabaca	1910	1952	2375	2813	3487
19.Villa Kananga	2490	2813	3714	7548	11,173
Total	41,392	58,472	84,884	117,708	133,293

Pop. 15,456 – 4 barangays

Source: PSO XIII / City Planning and Development Office, Butuan City

3. Land Use Profile of Flood Control and Urban Drainage System

of Flood Control and Urban Drainage System Influence Barangays

Barangay	Residential (Ha)	Institutional (Ha)	Commercial (Ha)	Industrial (Ha)	Agricultural (Ha)	Forrestal (Ha)	Roads (Ha)	Vacant lots (Ha)	Water ways	Others
Urban Barangays	Total of 1,831.68 hectares divided into :									
Agao, Bading, Bayanihan, Baan Riverside, D. Silang, Dagohoy, Golden Ribbon, Holy Redeemer, Humabon, Imadejas, J.Rizal, Lapu-lapu, L.Kilat, Limaha, Mahogany, Maon, New Society, Ong Yiu,Port Poyohon, Rajah Salima, San Ignacio, Sikatuna, Silongan, Obrero, Urduja, Tandang Sora	316.25	29.71	41.74	25.23	367.93	0.17	53.60	254.56	94.12	648.37
									474.5 persons/ km^2	

Source: Butuan City Comprehensive Land Use Plan 1997-2010 and DRRMP Plan for 2015-2017

2015	Residential	Institutional	Commercial	Industrial	Agricultural	Forrestal	Swampy	Idle Lands	Total
1. Ambago	314.40	-	10	-	24	10	20	8	386.40
2. Aupagan	50	-	-	-	720	35	10	174	989
3. Baan Km 3	10.30	-	32	11.20	226	-	0.20	1	291
4. Banza	174	-	20	-	323.10	-	300	-	817.10
5. Bit os	260	-	140	-	4,735.20	9,919	15	-	15,079.20
6. Doongan	271	-	25	-	20	10	5	10	341
7. Bonbon	120.20	-	1.0	-	396.80	231.50	-	3.0	752.50
8. Libertad	286	-	7.40	-	722	29.50	-	-	1044.90
9. Lumbocan	90	-	58	-	179.90	-	-	12.30	340.20
10. Mahay	300	-	30.10	-	323.20	-	20	-	673.30
11. Maug	42.50	-	6.50	-	152.40	25	87	14.0	327.40
12. San Vicente	228	-	5	-	160	.50	2.50	3	399
13. Tagabaca	20	-	7	-	854.40	100.30	40	100	1,121.70
14. Masao	60	-	56.30	-	396.10	-	-	-	512.40
15. Villa Kananga	118.70	-	25	-	56	10	5	10	224.70
16. Pangabugan	no data								
17. Pagatpatan	no data								
18. Babag	no data								
19. Agusan Pequeno	no data								
	26661.35	29.71	465.04	36.43	9657	461.89	534.70	589.86	232.90

50.08 pesos/ha22904-78255.82 p/ha

Year	Residential	Government	Commercial 1	Commercial 2 / Industrial	Bulk Sale/Whole sale	Total Billed Connection
1989	7880	77	-	807	-	8764
1990	7969	79	-	1,022	-	9070 / 3.49
1	8831	83	-	1,011	-	9925 / 9.24
2	9656	81	-	1002	-	10739 / 8.2
3	10,428	89	-	1069	-	11586 / 7.8
1994	11,008	94	-	1185	-	12,287 / 6.0
2008	28,933	315	986	850	17	31,101
9	29,204	321	1028	878	23	31,454 / 113
2010	30,280	326	1034	917	26	32,583 / 3.59
1	30,929	347	1109	969	29	33,383 / 2.4
2	32,115	370	1266	1064	32	34,847 / 4.3
3	33,969	384	1353	1126	43	36,875 / 5.8
4	35,355	402	1368	1227	57	38,409 / 4.16
2015	37,185	414	1339	1336	59	40,333 / 5.0
6	39,737	436	1341	1385	57	42,956 / 6.5
2017	42,027	434	1349	1470	66	45,346 / 5.55

4. DPWH ICC Memo

MEMORANDUM

FOR	:	**The Chairman and Members** **Investment Coordination Committee**
FROM	:	**The ICC Secretariat**
SUBJECT	:	**LOWER AGUSAN DEVELOPMENT PROJECT (LADP) FLOOD CONTROL COMPONENT, PHASE II**
Date	:	**18 July 1996**

1. Background. The project was presented to the ICC Technical Board in its meetings of 29 January and 27 February 1996. The Board endorsed the project for approval by the ICC Cabinet Committee subject to the following conditions:

   a. That DPWH secure Memoranda of Agreement (MOA) with the local government units (LGUs) indicating the latter's firm commitment to the implementation of the project and specifying the activities and resources that the LGUs will make available to the proponent to ensure the successful implementation of the project, and

   b. That the project's right-of-way (ROW) acquisition plan reflecting the LGUs responsibility for the ROW acquisition.

   c. That DPWH present to ICC its ranked priority list of all on-going and proposed foreign-assisted and locally-funded projects and identify projects that address devolved functions and those proposed for Build-Operate-Transfer (BOT).

2. The Board noted that DPWH has been programming projects way beyond its approved budget ceiling. Budgetary constraints make it impossible to implement all of its on-going and proposed projects. The list of projects should be ranked according to priority of implementation so as to properly guide the ICC in approving DPWH projects in the future.

3. In compliance with the said conditions, the two MOAs have been signed by and between the DPWH and the local government units. The first MOA was signed by and between the DPWH through the Cotabato-Agusan River Basin Project - Project Management Office (CARBDP-PMO), the City government of Butuan and the Provincial Government of Agusan del Norte. As stipulated in the MOA, the parties have agreed and bind themselves as follows:

a. Obligations and Responsibilities of the DPWH:

i. Acquire the right-of-way directly affected by the whole LADP Stage I Phase II project including the 170 hectares intended for the Spoil Bank Yard to accommodate dredged materials.

ii. Undertake the construction of all the stipulated scope of works in the aforesaid project.

iii. Turn-over the completed structures including the 170 hectares reclaimed Spoil Bank Yard to the City for the purpose of undertaking the necessary operation, ordinary repair and maintenance and/or further development or improvement thereof including whatever equipment and tools procured for maintenance purposes.

b. Obligations and Responsibilities of Butuan City:

i. Assist the DPWH in facilitating ROW acquisition including resolution of problems involving demolition of illegal improvements and relocation of affected settlers.

ii. Accept for DPWH the completed structures of the aforesaid project and undertake the necessary operation, ordinary repair and maintenance including further development or improvement thereof including whatever equipment and tools procured for maintenance purposes.

iii. Acquire at least thirty (30) has. of suitable areas to be developed into Satellite Resettlement sites complete with basis facilities and amenities such as but not limited to water supply and electric power connections, road network and drainage system, etc., for the benefit of the affected residents in their respective barangays.

iv. Undertake watershed management activities in coordination with the DENR and the Province, e.g., reforestation projects, etc.,

v. Operate and maintain the Flood Warning System that may be provided and installed in designated areas by DPWH in cooperation with PAG-ASA.

vi. Undertake routine monitoring activities during the project implementation.

c. Obligations and Responsibilities of the Province (Agusan del Norte)

i. Extend assistance to DPWH and the City to facilitate resolution of ROW acquisition problems including demolition of illegal structures and improvements and the relocation of affected settlers.

c. Relocation and/or resettlement of affected families shall be in accordance with the order of priority areas affected by the LADP, Stage I, Phase I.

d. Project beneficiaries shall be those firms and qualified families as identified by the DPWH survey and those bonafide residents within the project boundaries and defined item 4.a who are qualified beneficiaries of the project under the "statement of policies" for the resettlement project, jointly agreed by DPWH and the City.

e. Policies, rules and regulations pertinent to beneficiaries selection , resolution of the land claimants issues lot allocation and priority of lot allocation shall be governed by "statement of policies" jointly agreed by the City and DPWH.

f. Homelots generated by the project shall be disposed of to the project beneficiaries under the administration of the City.

5. Please find attached herewith is the Project Evaluation report containing the details (e.g., description, objectives, cost and feasibility indicators) as well as the main points discussed during the Appraisal of the project conducted by the OECF Mission last May 1996.

6. For consideration.

ii. Undertake the ordinary repair and maintenance of the completed structures within its jurisdiction e.g., levees and diversion channels, etc..

iii. Undertake watershed management activities in coordination with DENR and the CITY, e.g., reforestation projects, etc.

iv. Undertake the routine monitoring and evaluation activities during and after the implementation project.

4. The second MOA was entered into by and between DPWH and the City Government of Butuan for the right-of-way (ROW). Acquisition and Resettlement Plan reflecting the responsibilities of both parties. Both parties have agreed as follows:

a. The project shall consist of the relocation and/or resettlement of about 1,500 families and some major establishments affected by Stage I Phase I (West Bank) construction of the LADP project, to be situated in Barangay Pagatpatan.

b. The project component shall include the following:

i. Provision of 100 has. duly acquired by the National Government through DPWH and upgraded through filling of dredged materials by DPWH.

ii. Provision of appropriate main access road and major drainage facilities by DPWH.

iii. Provision of suitable area to be developed into a residential, commercial and industrial purposes by the city.

iv. Provision of basic community facilities such as open spaces/recreation areas and government centers by the city.

v. Provision of basic utilities such as road networks/footpaths, drainage system, water system, electric power connections, etc., by the city.

vi Provision for economic services through technical assistance for livelihood programs to improve the living conditions of the residents/beneficiaries by the city.

vii. Promotion of community involvement in the development of their social and physical environment by the city.

viii. Resolution of land tenure through the delivery and awarding of lots to the beneficiaries by the city.

5. Status Of Foreign Assisted Projects
(As of June 30, 2017)

Ref. AOM No: DPWH-OSEC-F10-2017-013(16)

Agency Address	Project Name & Components	Contractor/ Consultants	Loan Effectivity Date	Loan Closing Date	Loan Amount	Approved Original Cost (Php)	Revised Project Cost (Php)	Date Started	Original Completion Date	Revised Completion Date	Project Status		Remarks
											% of Completion	Total Cost Disbursed	
Dept of Public Works and Highways, Unified Project Management Office - Flood Control Management Cluster	Lower Agusan Development Project (LADP) Stage 1, Phase 2				7.979 Million Japanese Yen								
	C.P.1- Agusan River Improvement in East Bank and Cut-off Channel	China International Water and Electric Corporation (CWE)	June 26, 1997	Feb 26, 2007		638,648,657.91	889,009,907.35	June 28, 2003	Nov 25, 2005	Oct 12, 2006	100%	889,009,907.35	Contract has been closed and final billing has been settled
	C.P.2- Construction of Magsaysay Viaduct	F.F. Cruz & Company, Inc.	June 26, 1997	Feb 26, 2007		427,121,153.06	497,441,818.80	April 2, 2004	July 3, 2006	Aug 30, 2007	100%	497,441,818.80	Contract has been closed and final billing has been settled
	C.P.3- Improvement of Banza River and Land Improvement	Kajima Corp. Ciriaco Corp. Joint Venture	June 26, 1997	Feb 26, 2007		439,049,922.42	622,307,408.16	Mar 28, 2000	Jan 27, 2004	Aug. 13, 2004	100%	622,307,408.16	Contract has been closed and final billing has been settled
	C.P.4- Masao River Improvement and Construction of Urban Drainage System in Butuan City	Kajima Corp.	June 26, 1997	Feb 26, 2007		706,934,096.62	1,265,246,071.57	Apr 14, 2001	Feb 11, 2004	May 31, 2010	100%	1,694,396,068.60	Contract has been closed and final billing has been settled
	Consultancy Services of Lower Agusan Development Project, Stage 1, Phase 2	NIPPON KOEI CO., LTD. In association with TCGI Engineers and PKII Engineers	June 26, 1997	Feb 26, 2007		386,256,553.86	449,909,578.00	Dec 10, 1997	June 10, 2005	Sept 3, 2006	100%	449,909,578.00	Contract has been closed and final billing has been settled

Note: Please indicate remarks column if the contract of each Contractor/Consultant for the project/s has been closed and/or final billing has been settled.

6. Approved Building Permits Issued 2005-2015

OFFICE: OFFICE OF THE CITY ARCHITECT

Approved Building Permits from 2005 to 2018

YEAR	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
RES. INDIGENOUS	94	404	1000	979	1056	1506	1461	1912	3251	1821	1323	2564	1493	1108	19972
RES. STANDARD	543	532	584	533	544	679	540	572	552	477	607	495	649	1655	8962
INDUSTRIAL	19	18	24		35	16	15	19	21	32	7	10	4	10	230
INSTITUTIONAL	25	37	28	40	37	17	22	21	25	34	30	43	23	16	398
ANCILLARY	5	11			6	4	6					4	2		38
COMM. Bldg.	153	169	160	135	107	152	180	188	227	197	178	158	409	166	2579
GOVT. BLDG.	6	11	6	2	7	10	7	3	6	2	5	2	24	53	144
MAUSOLEUM	1		2	1	1	2	7	13	7	10	3	11	13	3	74
SIGNAGE	5	11	3			5	4	2	1			1			32
SHED HOUSE	6			2			4		2						14
GARAGE	1														1
FAÇADE	1														1
SWIMMING POOL	1												1		2
PIGGERY				1											1
COVERED COURT				1											1
TOP CANAL COVER									1						1
CHAPEL										1					1
CONVENT											1				1
PAVEMONT											1				1
SIGN BOARD														95	95
BILL BOARD									1			1		4	6
CHAPEL										1					1
BODEGA											1				1
FARM HOUSE													2		2
TOTAL	860	1193	1807	1694	1793	2391	2246	2730	4094	2575	2156	3289	2620	3110	32558
TOTAL INCOME	2,070,690.62					10,852,371.51	11,900,956.51	11,758,524.28	14,800,409.26	16,256,584.27	14,552,843.00	15,772,564.54	17,052,098.83		115,017,042.82

PREPARED BY:

BRIDGET FAYE M. EVANGELISTA
Admin. Assistant

REVIEWED BY :

ENGR. JOVENCIA C. BELGIRA
OIC-City Architect

7. Deed of Transfer: DPWH to LGU

05 May 2011

Hon. FERDINAND M. AMANTE, JR., M.D.
City Mayor, Butuan City

Subject : Deed of Transfer of Maintenance Equipment and Dump Trucks re: Lower Agusan Development Project, Flood Control Component, Butuan City

Dear Mayor Amante:

We are pleased to transmit herewith the Deed of Transfer of Maintenance Equipment and Dump Trucks for the maintenance activities of the Lower Agusan Development Project, Flood Control Component in Butuan City, duly approved by the Honorable Secretary Rogelio L. Singson, this Department.

Our staff in Butuan City will coordinate with the City for the execution of the Deed of Transfer.

Thank you!

Very truly yours,

ROGELIO O. ANG, CEO VI
OIC-Project Director

DEED OF TRANSFER

KNOW ALL MEN BY THESE PRESENTS:

This Deed of Transfer is made, and entered into this MAY 02 2010 day of _____, 2010 by and between:

The Department of Public Works and Highways through the Major Flood Control and Drainage Project – Project Management Office, Cluster II (MFCDP-II – PMO) with office address at DPWH NCR Compound, 2nd Street, Delpan, Port Area, Manila, represented herein by its Project Director, **PHILIP F. MEÑEZ**, hereinafter referred to as the **TRANSFEROR**;

- and -

The City Government of Butuan, a local government unit with office address at new City Hall Complex, Brgy. Doongan, Butuan City, represented herein by its City Mayor, **HONORABLE FERDINAND M. AMANTE, JR., M.D.**, hereinafter referred to as the **TRANSFEREE**;

- WITNESSETH -

WHEREAS, the parties hereto do have made and entered into a Memorandum of Agreement (**MOA**) concerning the implementation of Lower Agusan Development Project, Flood Control Component, Phase II (LADP-FC-II) which salient provisions thereof provided for the turn-over of completed structures/projects and equipment and tools procured for maintenance purposes of LADP-FC-II by the **TRANSFEROR** to the **TRANSFEREE** particularly identified as Doc. No. 466, Page No. 94, Book No. 45 Series of 1996 of the Notarial Register of Atty. Carlito Yebes, notary public for and in Butuan City, a machine copy of which is hereto attached and marked as **Annex A**";

WHEREAS, the completed construction of the Lower Agusan Development Project, Stage I, Phase II in Butuan City (LADP-FC-II) more particularly the sub-components thereof such as the Drainage Canals, Levee Embankment, Box Culverts, Sluice Gates & other related structures were turned-over accordingly to the City Government of Butuan for appropriate maintenance & repair programs to ensure the sustainability of these flood control and drainage projects to address the perennial flooding problem of Butuan City;

WHEREAS, the **TRANSFEROR**, is the true and registered owner of the following heavy equipment, dumptrucks, listed hereunder, which were acquired and intended for the maintenance and repairs of completed project in the implementation of Lower Agusan Development Project, Flood Control Component, Phase II (LADP-FC-II) in Butuan City, viz:

Qty.	Unit	Type of Body	Make/Model	Motor No.	Chassis No.	Plate No.	DPWH Code No.
1	Unit	Dumptruck	Nissan, (White) UD 6 Tonner Class/Diesoline	FE6-220705 C	LKC210D-01296	SEM-957	H3-6399
1	Unit	Dumptruck	Nissan, (White) UD 6 Tonner Class/Diesoline	FE6-220713 C	LKC210D-01299	SEM-961	H3-6401
1	Unit	Payloader	Hitachi LX70-7 Wheel Type	90935	RYU4F000600 005747	N/A	L2-1440
1	Unit	Backhoe Excavator	Hitachi, Zaxis 0.35m3	91020	HCM1EY00J0 0011204	N/A	F16-30

WHEREAS, the **TRANSFEROR** is likewise willing to transfer to the **TRANSFEREE,** without cost the above listed heavy equipments to be used ***exclusively for the repair and maintenance of the completed flood control & drainage facilities***;

Represented by:

ROGELIO O. ANG
Project Manager III
PMO-MFCDP/Cluster II

ENILA M. OYAYON
Acting City Engineer
Butuan City

FERDINAND M. AMANTE, JR. M.D.
City Mayor

Represented by:

PHILIP F. MEÑEZ
Project Director - PMO-MFCDP, Cluster II

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
Project Management Office
MAJOR FLOOD CONTROL & DRAINAGE PROJECTS-Cluster II
Manila

May 5, 2011

OFFICE OF THE MAYOR
CITY OF BUTUAN
RECEIVED BY: Pabio, M.
DATE: 5-10-11
TIME: 10:50 am
BY:

TRANSMITTAL SHEET

TO : **SERGIO M. MULAWAN, JR.**
Project Engineer III
OIC-LADP II, Butuan City

ATTENTION : **JULIET AGCOPRA**

SUBJECT : **Approved Deed of Transfer of Maintenance Equipment and Dump Trucks in favour of the City Government of Butuan City.**

ENCLOSURE : *Original copy of the above subject.*

REMARKS : For appropriate action.

ROGELIO O ANG, CEO VI
OIC-Project Director

CITY ENGINEER'S OFFICE
RECEIVED
BY
DATE 5/10/11
TIME 3:50
CONTROL NO.
BUTUAN CITY

Received by : _____
Date : _____

ADDRESS: DPWH-NCR Compound 2nd St. Del Pan. Port Area, Manila TEL. NO. (02) 304-3643, (02) 304-3924 FAX (02) 304-3829

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)
CITY OF BUTUAN .....) s.s.
CITY OF MANILA

Before me a Notary Public and in the City of Butuan MAY 02 2011 day of _____, 2010, personally appeared to me PHILIP F. MENEZ, with his Community Tax Certificate No. 6554398, issued on JANUARY 7, 2011, Issued at BACOLOD CITY, and **FERDINAND M. AMANTE, JR. M.D.** with his Community Tax Certificate No. _____, Issued on _____, 2010, Issued at _____, known and to be the same persons who executed the foregoing instrument the acknowledgement is written and acknowledged to me that the same is their free act and voluntary deed.

WITNESS MY HAND AND ZEAL.

ATTY. PEDRO D. GENATO
DOC. NO. _____ NOTARY PUBLIC
PAGE NO. _____ UNTIL DEC. 31, 2011
BOOK NO. _____ SERIES OF 2011
IBP # 762706/MLA 10-27-09
PTR # 9229007 MLA/1-3-2011

Doc. No. 846
Page No. 170
Book No. 70
Series No. 54

Lungsod ng Butuan

12th Sangguniang Panlungsod
8th Regular Session
Series of 2011

A RESOLUTION ADOPTED BY THE HONORABLE SANGGUNIANG PANLUNGSOD OF THE CITY OF BUTUAN IN ITS REGULAR SESSION HELD AT THE SP SESSION HALL ON FEBRUARY 21, 2011

PRESENT:

Honorable Lawrence Lemuel H. Fortun	*- City Vice Mayor Presiding Officer*
Honorable Erwin L. Dano	*- Member*
Honorable Ryan Anthony B. Culima	*- Member*
Honorable Josephine P. Marticion-Salise	*- Member*
Honorable Angelo S. Calo	*- Member*
Honorable Randolph B. Plaza	*- Member*
Honorable Ramon P. Carampatana	*- Member*
Honorable Audie G. Bernabe	*- Member*
Honorable Jaime M. Cembrano, Jr.	*- Member*
Honorable Raul O. Amoc	*- Member*
Honorable Virgilio G. Nery, Jr.	*- Member*
Honorable Nestor D. Amora	*- Member/President Liga ng mga Punong Barangay*
Honorable Rauzil A. Carampatana	*- Member/President Sangguniang Kabataan Federation*

ABSENT:

None

The meeting was called to order at exactly 5:10 in the afternoon.

<o>

SP RESOLUTION NO. 209-2011

A RESOLUTION AUTHORIZING CITY MAYOR FERDINAND M. AMANTE, JR., TO SIGN FOR AND IN BEHALF OF THE CITY GOVERNMENT OF BUTUAN, A DEED OF TRANSFER EXECUTED BY AND BETWEEN THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS, CARAGA REGION, THROUGH THE MAJOR FLOOD CONTROL AND DRAINAGE PROJECT-PROJECT MANAGEMENT OFFICE, CLUSTER II (MFCDP II-PMP) AND THE CITY GOVERNMENT OF BUTUAN, AND FOR OTHER PURPOSES

NOW, THEREFORE, for and in consideration of the foregoing premises, the **TRANSFEROR** hereby transfer, cedes and conveys unto the **TRANSFEREE**, all without cost and free from all liens and encumbrances, the following heavy equipments, viz:

Qty.	Unit	Type of Body	Make/Model	Motor No.	Chassis No.	Plate No.	DPWH Code No.
1	Unit	Dumptruck	Nissan, (White) UD 6 Tonner Class/Diesoline	FE6-220705 C	LKC210D-01296	SEM-957	H3-6399
1	Unit	Dumptruck	Nissan, (White) UD 6 Tonner Class/Diesoline	FE6-220713 C	LKC210D-01299	SEM-961	H3-6401
1	Unit	Payloader	Hitachi LX70-7 Wheel Type	90935	RYU4F00060 0005747	N/A	L2-1440
1	Unit	Backhoe Excavator	Hitachi, Zaxis 0.35m3	91020	HCM1EY00J 00011204	N/A	F16-30

IN WITNESS WHEREOF, the parties have hereunto signed this Deed of Transfer on _____, 2010 at Butuan City, Philippines.

Department of Public Works & Highways (DPWH)
(TRANSFEROR)

By:

PHILIP F. MEÑEZ
Project Director
PMO-MFCDP, Cluster II

City Government of Butuan
(TRANSFEREE)

By:

FERDINAND M. AMANTE, JR. M.D.
City Mayor
Butuan City

SIGNED IN THE PRESENCE OF:

1. **ROGELIO O. ANG**
Project Manager III
PMO-MFCDP, Cluster II

2. **ENRIQUE P. GAYON**
Acting City Engineer
Butuan City

APPROVED:

ROGELIO L. SINGSON
Secretary
DPWH

WIN1V09113

ATTESTED:

AURORA B. CABALLES
City Government Department Head II
City Secretary

Authors	*: Hon. Angelo S. Calo*
	: Hon. Jaime M. Cembrano, Jr.
	: Hon. Virgilio G. Nery, Jr.
	: Hon. Rauzil A. Carampatana
Movant	*: Hon. Angelo S. Calo*
Seconders	*: Hon. Ryan Anthony B. Culima*
	: Hon. Jaime M. Cembrano, Jr.

WHEREAS, forwarded for urgent consideration is letter dated February 9, 2011 of City Mayor Ferdinand M. Amante, Jr., requesting for an authority to sign the Deed of Transfer executed by and between the Department of Public works and Highways, Caraga Region, through the Major Flood Control and Drainage Project-Project Management Office, relative to the turn-over of maintenance equipment to the City Government of Butuan, Lower Agusan Development Project (LADP), Stage I, Phase III, Butuan City;

WHEREAS, in a Memorandum of Agreement entered into by and between the Department of Public Works and Highways (DPWH) through the Cotabato Agusan River Basin Development Project – Project Management Office (CARBDP-PMO) and the City Government of Butuan, both parties agreed for the DPWH to turn-over the completed structures in the aforestated project including the equipments and tools procured for maintenance purposes;

WHEREAS, the DPWH is willing to transfer to the City Government of Butuan without cost the following equipment to be used exclusively for the repair and maintenance of the completed flood control and drainage facilities, as follows:

1. One (1) Unit Dumptruck (white Nissan, UD 6 Tonner Class/Diesoline);
2. One (1) Unit Dumptruck (white Nissan, UD 6 Tonner Class/Diesoline)
3. One (1) Unit Payloader (Hitachi LX70-7 Wheel Type); and
4. One (1) Unit Backhoe Excavator (Hitachi, Zaxis 0.35m3).

WHEREAS, this Body finds the terms and conditions of the said document in order and advantageous to the city.

NOW THEREFORE, upon motion of Honorable Angelo S. Calo, jointly seconded by Honorable Ryan Anthony B. Culima and Honorable Jaime M. Cembrano, Jr., be it –

RESOLVED, to authorize His Honor, City Mayor Ferdinand M. Amante, Jr., to sign for and in behalf of the City Government of Butuan, A Deed of Transfer executed by and between the Department of Public Works and Highways through the Major Flood Control and Drainage Project – Project Management Office, Cluster II (MFCDP-II-PMP) and the City Government of Butuan.

RESOLVED FURTHER, to furnish copies of this Resolution to the Office of the City Mayor, City Administrator, DPWH, Caraga Region, and Mr. Philip F. Menez, Project Director, PMO-MFCDP, Cluster II, this city, for information and guidance.

Unanimously Approved

Date Enacted: *February 21, 2011*
Date Approved: *March 4, 2011*

APPROVED:

LAWRENCE LEMUEL H. FORTUN
City Vice Mayor
Presiding Officer

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
Project Management Office
COTABATO-AGUSAN RIVER BASIN DEVELOPMENT PROJECT
(CARBDP-PMO)

January 20, 2012

HON. FERDINAND M. AMANTE, JR.
City Mayor
City of Butuan

CITY OF BUTUAN
OFFICE OF THE MAYOR
RECEIVED
DATE: 1-20-12
TIME: 1:05 AM PM
BY:

Dear Sir;

This is to formally transmit to the City Government of Butuan the herein copy of the DEED OF TRANSFER made and entered into by and between the Republic of the Philippines duly represented by the Department of Public Works & Highways and the City Government of Butuan on the 49.8414 hectares of the Over-All Resettlement Area (ORA) consisting of 26 titles located at Butuan City duly notarized under Doc. no. 246, Page no. 25, Book no. III, Series of 2012 in the Notarial Register of Atty. Annaliza L. Gonzales, notary public,-this City.

Please acknowledge receipt hereof.

Very truly yours,

ROGELIO Q. ANG, CEO VI
OIC – Project Director
Head, MFCDP, Cluster II

1/20/12

MAIN OFFICE:
DPWH XI Regional Office Compound
R. Magsaysay Ave., Davao City
Tel. No. 227-4416 / 221-7605
Fax (082) 221-7556

LIASON OFFICE:
DPWH NCR Compound
2nd St., Del Pan, Port Area, Manila
Tel. No. (02) 304-3829 / 3643

FIELD OFFICE:
LOWER AGUSAN DEV. PROJ (LADP
Project Engineering Office
Doongan, Butuan City
Tel. No. (085) 341-3679

IMA - INC

EPAR
(PHL);

DEED OF TRANSFER

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDENG G. ISMANOS
City Gov't. Department Head II, CHDO

KNOW ALL MEN BY THESE PRESENTS:

This **DEED OF TRANSFER** made and entered into this ___ day of _____, 2011 by and between:

The **REPUBLIC OF THE PHILIPPINES**, for this act duly represented by the Undersecretary of the Department of Public Works and Highways **RAFAEL C. YABUT**, with principal office at Bonifacio Drive, Port Area, Manila, hereinafter referred to as the "DPWH";

-and-

The **BUTUAN CITY GOVERNMENT**, a government entity existing under the laws of the Republic of the Philippines, with principal office at new City Hall Complex, Brgy. Doongan, Butuan City, represented by its City Mayor, FERDINAND M. AMANTE, JR. M.D. pursuant to SP Resolution No. 722-2011 and hereinafter referred to as the "CITY"

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

WITNESSETH:

WHEREAS, the DPWH through Cotabato-Agusan River Basin Development Project (CARBDP is the implementing agency of the Lower Agusan Development Project, Flood Control Component, Phase II;

WHEREAS, aside from the major flood control project constructed and completed during the implementation of Lower Agusan Development Project, Flood Control Component, Phase II in Butuan City, it also included the provision of some FIFTY NINE (59) HECTARES of land in different barangays of Butuan City representing the social component of the project to address the relocation and resettlement needs of those families residing within the flood way (danger zone) of Agusan River denominated as the Overall Resettlement Area (ORA);

WHEREAS, an amendment to the previous Memorandum of Agreement (MOA) was made and entered into by and between the Department of Public Works and Highways (DPWH) represented therein by former Project Director of Project Management Office-Major Flood Control & Drainage Project, Cluster II (PMO-MFCDP II) and the City Government of Butuan represented therein by then City Mayor, Democrito D. Plaza II, which MOA was also approved by then Secretary of DPWH, Hermogenes E. Ebdane, Jr. in CY 2007;

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL C. YABUT
Undersecretary for PMO Operations, DPWH

WHEREAS, among the salient provisions of the said MOA is for DPWH to turn over about 58 hectares of land located at different barangays of Butuan City denominated as the Overall ORA;

WHEREAS, about 49.8414 hectares of the ORA consisting of 26 titles are now acquired and transferred in the name of the Republic of the Philippines (PHL);

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC, Project Director, MFCDP II, DPWH

LORDEN G. ISMANOS
City Gov't. Department Head II, CHDO

WHEREAS, it is necessary that the lots now transferred in the name of the PHL be turned over immediately to the City Government of Butuan to allow the City Government to immediately undertake site development;

WHEREAS, the 49.84 hectares of the ORA registered in the name of the Republic of the Philippines and its corresponding Transfer Certificate of Title Nos. and location are listed hereunder, viz.;

TCT Nos.	Location	Area
TCT No. 39389 (PHL)	Brgy. Baan, Km. 3	24,414
TCT No. RT-29724 (PHL)	Brgy. Baan, Km. 3	20,000
TCT No. RT-38490 (PHL)	Brgy. Baan, Km. 3	10,000
TCT No. RT-38789 (PHL)	Brgy. Baan, Km. 3	5,000
RT-52644 (PHL)	Brgy. Baan, Km. 3	21,796
RT-52639 (PHL)	Brgy. Baan, Km. 3	4,430
RT-52640 (PHL)	Brgy. Baan, Km. 3	15,000
RT-52641 (PHL)	Brgy. Baan, Km. 3	5,840
RT-54031 (PHL)	Brgy. Baan, Km. 3	15,000
RT-52642 (PHL)	Brgy. Baan, Km. 3	15,000
RT-52643 (PHL)	Brgy. Baan, Km. 3	10,570
RT-53697 (PHL)	Brgy. Baan, Km. 3	15,000
TCT No. RT-39161 (PHL)	Brgy. Taguibo	10,000
TCT No. RT-39518 (PHL)	Brgy. Taguibo	51,264
TCT No. T-18210 (PHL)	Brgy. Cabcabon	38,452
TCT No. T-31681 (PHL)	Brgy. Cabcabon	38,455
TCT No. T- 29763 (PHL)	Brgy. Cabcabon	3,093
TCT No. RT-39402 (PHL)	Brgy. Cabcabon	20,000
TCT No. T-28199 (PHL)	Brgy. Cabcabon	20,000
TCT No. T-19594 (PHL)	Brgy. Tiniwisan	10,000
TCT No. T-19647 (PHL)	Brgy. Tiniwisan	9,999
TCT No. T-29242 (PHL)	Brgy. Tiniwisan	10,000
TCT No. T-29728 (PHL)	Brgy. Tiniwisan	10,000
TCT No. T-29243 (PHL)	Brgy. Tiniwisan	10,000
TCT No. RT-38399 (PHL)	Brgy. Mahay	94,326
TCT No. RT-56612 (PHL)	Brgy. Tagabaca	10,775
	TOTAL	498,414

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

WHEREAS, a request for the authority to transfer the possession and ownership of the 49.8414 hectares which are presently registered in the name of the Republic of the Philippines to the City Government of Butuan is approved accordingly by the Office of the President of the Republic of the Philippines per memorandum of the Executive Secretary dated 28 July 2011.

NOW, THEREFORE, for and in consideration of the foregoing premises and mutual covenants herein stipulated, the parties do hereby bind themselves and agree to the following:

1. The DPWH hereby cedes, transfers and conveys unto the City of Butuan the following parcels of land identified and described below:

   1.1. **Brgy. Baan, Km. 3** (TCT No. RT-39389) - A parcel of land (Lot 4 of the Subdivision Plan (LRC), Psd-59771, being a portion of the land described on Plan, H-93635, LRC Record No. H. Patent No. 36471) situated in the Barrio of Baan, City

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL C. YABUT
Undersecretary for PMO Operations, DPWH

of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the NE., along lines 4-5-1 by the property of Zacarias Abunacion; on the SE., along lines 1-2-3 by Lot 3 of the Subdivision Plan; on the SW., along line 2-3 by the property of Fernando Cubillas; and on the NW., along line 3-4 by Lot 5 of the Subdivision Plan. Beginning at a point marked "1" on the Plan being S., 10 deg. 59'E., 20407.53m from BLLM No 1, Municipality of Cabadbaran, thence:

S. 75 deg. 55'W.,	195.70 m	to point 2;
N. 10 deg. 06'W.,	137.69 m	to point 3;
N. 80 deg. 41'E.,	183.41 m	to point 4;
S. 12 deg. 29'E.,	43.36 m	to point 5;
S. 17 deg. 44'E.,	73.95 m	to point of;

containing an area of TWENTY-FOUR THOUSAND FOUR HUNDRED FORTEEN (24,414) SQUARE METERS, more or less.

1.2. **Brgy. Baan, Km. 3** (TCT No. RT-29724) - A parcel of land (Lot 1, F-13-000189-D) situated in the Barrio of Baan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the N., along line 7-1 by Lot 2, F-13-000189-D; on the E., along line 1-2 by Lot 6 (LRC), Psd-59771 Nurmeliano Cubillas, along line 2-3 by Lot 5, (LRC) Psd-59771 Jose Makinano; on the S., along line 3-4 by Adora Cubillas; on the W., along lines 4-5-6-7 by H.O. Lamanilao. Beginning at a point marked "1" on the Plan being S., 10 deg. 27'E., 19971.00m from BLLM No 1, Municipality of Cabadbaran, thence:

S. 10 deg. 06'E.,	108.01 m	to point 2;
S. 10 deg. 06'E.,	139.68 m	to point 3;
S. 83 deg. 03'W.,	91.47 m	to point 4;
N. 01 deg. 46'W.,	87.81 m	to point 5;
N. 06 deg. 43'W.,	56.80 m	to point 6;
N. 16 deg. 29'W.,	100.15 m	to point 7;
N. 80 deg. 12'E.,	86.40 m	to point of,

containing an area of TWENTY THOUSAND (20,000) SQUARE METERS, more or less.

1.3. **Brgy. Baan, Km. 3** (TCT No. RT-38490) - A parcel of land (Lot 5-C, Psd-13-006565, being a portion of Lot 5 (LRC), Psd-59771) situated in the Barrio of Baan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the N., along line 4-1 by Lot 5-B of the subdivision plan Psd-13-006565; on the E., along line 1-2 by Lot 7, (LRC) Psd-59771; on the S., along line 2-3 by Lot 4 (LRC) Psd-59771; and on the W., along line 3-4 by property Benito Torralba. Beginning at a point marked "1" on the Plan being S., 10 deg. 58'E., 20231.00m from BLLM No 1, Butuan Cadastre, thence:

S. 12 deg. 29'E.,	54.92 m	to point 2;

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDENG A. TISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL V. ABUT
Undersecretary for PMO Operations, DPWH

S. 80 deg. 41'W.,	183.41 m	to point 3;
N. 10 deg. 06'W.,	54.91 m	to point 4;
N. 80 deg. 42'E.,	181.13 m	to point of;

containing an area of TEN THOUSAND (10,000) SQUARE METERS, more or less.

1.4. **Brgy. Baan, Km. 3** (TCT No. RT-38789) - A parcel of land (Lot 5-A, Psd-13-006565, being a portion of Lot 5 (LRC), Psd-59771) situated in the Barrio of Baan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the N., along lines 1-2-3 by Lot 6 (LRC) Psd-59771; on the E., along line 3-4 by Lot 7 (LRC) Psd-59771; on the S., along line 4-5 by Lot 5-B of the subdivision plan Psd-13-006565; and on the W., along line 5-1 by property of Benito Torralba. Beginning at a point marked "1" on the Plan being S., 10 deg. 27'E., 20079.20m from BLLM No 1, Butuan Cadastre, thence:

N. 79 deg. 24'E.,	100.81 m	to point 2;
N. 10 deg. 06'W.,	30.68 m	to point 3;
S. 45 deg. 52'E.,	81.92 m	to point 4;
S. 80 deg. 42'W.,	148.71 m	to point 5;
N. 10 deg. 06'W.,	32.80 m	to point of;

containing an area of FIVE THOUSAND (5,000) SQUARE METERS, more or less.

1.5. **Brgy. Baan, Km. 3** (TCT No. RT-52644) - A parcel of land (Lot 7, of the Subdivision Plan (LRC) Psd-59771, being a portion of the land described on plan H-93635, LRC Record No. H. Patent No. 36471) situated in the Barrio of Baan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along lines 2-3-4 by the property of Zacarias Abunacion; on the SW., along line 4-5 by Lot 5, points 5-1 by Lot 6, both of the Subdivision Plan; and on the NW., along line 1-2 by Lot 204, Q-88. Beginning at a point marked "1" on the Plan being S., 10 deg. 29'E., 18821.40m from BLLM No 1, Municipality of Cabadbaran, thence:

N. 79 deg. 49'E.,	189.00 m	to point 2;
S. 03 deg. 30'E.,	202.95 m	to point 3;
S. 12 deg. 29'E.,	32.00 m	to point 4;
N. 45 deg. 52'W.,	132.07 m	to point 5;
N. 46 deg. 35'W.,	135.00 m	to point 6;
N. 36 deg. 35'W.,	20.00 m	to point of;

containing an area of TWENTY-ONE THOUSAND SEVEN HUNDRED NINETY-SIX (21,796) SQUARE METERS, more or less.

1.6. **Brgy. Baan, Km. 3** (TCT No. RT-52639) - A parcel of land (Lot 5-D, Psd-13-007744, being a portion of Lot 4 & 5, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao.

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN R. VISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL T. YABUT
Undersecretary for PMO Operations, DPWH

Signed in the Presence of:

ROGELIO D. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN G. VISMANOS
City Gov't. Department Head II, CHDO

Bounded on the N., along line 1-2 by Irrigation Canal; on the E., along line 2-3 by Lot 4-C, Psd-13-007744; on the S., along line 3-4 by Lot 5-C, Psd-13-007744; and on the W., along line 4-1 by Lot 6, Pcs-10-000573. Beginning at a point marked "1" on the Plan being S., 14 deg. 12'E., 19367.72m from BLLM No 1, Q-88, thence:

N. 75 deg. 59'E.,	66.80 m	to point 2;
S. 10 deg. 11'E.,	68.70 m	to point 3;
S. 79 deg. 49'W.,	66.66 m	to point 4;
N. 10 deg. 11'W.,	64.24 m	to point of;

containing an area of FOUR THOUSAND FOUR HUNDRED THIRTY (4,430) SQUARE METERS, more or less.

1.7. **Brgy. Baan, Km. 3** (TCT No. RT-52640) - A parcel of land (Lot 5-B, Psd-13-007744, being a portion of Lot 4 & 5, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along line 1-2 by Lot 4-A, Psd-13-007744; on the S., along line 2-3 by Lot 5-A, Psd-13-007744; on the W., along lines 3-4-5 by Lot 6, Pcs-10-000573; on the N., along line 5-6 by Lot 5-C, Psd-13-007744; and on the E., along line 6-7 by Lot 4-B, Psd-13-007744. along line 7-1 by Lot 4-A, Psd-13-007744. Beginning at a point marked "1" on the Plan being S., 14 deg. 19'E., 19773.33m from BLLM No 1, Q-88, thence:

CITY GOVERNMENT OF BUTUAN

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City Mayor

S. 10 deg. 11'E.,	112.39 m	to point 2;
S. 79 deg. 49'W.,	66.66 m	to point 3;
N. 10 deg. 11'W.,	112.39 m	to point 4;
N. 10 deg. 11'W.,	112.63 m	to point 5;
N. 79 deg. 49'E.,	66.66 m	to point 6;
S. 10 deg. 11'E.,	112.63 m	to point 7;

containing an area of FIFTEEN THOUSAND (15,000) SQUARE METERS, more or less.

1.8. **Brgy. Baan, Km. 3** (TCT No. RT-52641) - A parcel of land (Lot 5-A, Psd-13-007744, being a portion of Lot 4 & 9, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the S., along line 1-2 by claimed Siverio F. Garcia; on the W., along line 2-3 by Lot 6, Pcs-10-000573; on the N., along line 3-4 by Lot 5-B, Psd-13-007744; and on the E., along line 4-1 by Lot 4-A, Psd-13-007744. Beginning at a point marked "1" on the Plan being S., 14 deg. 16'E., 19972.81m from BLLM No 1, Q-88, thence:

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RAFAEL C. ALCOBUT
Undersecretary for PMO Operations, DPWH

S. 79 deg. 49'W.,	66.66 m	to point 2;
N. 10 deg. 11'W.,	87.61 m	to point 3;
N. 79 deg. 49'E.,	66.66 m	to point 4;
S. 10 deg. 11'E.,	87.61 m	to point of;

containing an area of FIVE THOUSAND EIGHT HUNDRED FORTY(5,840) SQUARE METERS, more or less.

1.9. **Brgy. Baan, Km. 3** (TCT No. RT-54031) - A parcel of land (Lot 5-C, Psd-13-007744, being a portion of Lot 4 & 5, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along line 1-2 by Lot 4-B, Psd-13-007744; on the S., along line 2-3 by Lot 5-B, Psd-13-007744; on the W., along lines 3-4-5 by Lot 6, Pcs-10-000573; on the N., along line 5-6 by Lot 5-D, Psd-13-007744; and on the E., along line 6-1 by Lot 4-C, Psd-13-007744. Beginning at a point marked "1" on the Plan being S., 14 deg. 21'E., 19573.85m from BLLM No 1, Q-88, thence:

S. 10 deg. 11'E.,	87.37 m	to point 2;
S. 79 deg. 49'W.,	66.66 m	to point 3;
N. 10 deg. 11'W.,	87.37 m	to point 4;
N. 10 deg. 11'W.,	137.65 m	to point 5;
N. 79 deg. 49'E.,	66.66 m	to point 6;
S. 10 deg. 11'E.,	137.65 m	to point of;

containing an area of FIFTEEN THOUSAND (15,000) SQUARE METERS, more or less.

1.10. **Brgy. Baan, Km. 3** (TCT No. RT-52642) - A parcel of land (Lot 4-B, Psd-13-007744, being a portion of Lot 4 & 5, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along lines 6-1-2 by Lot 190, Q-88; on the S., along line 2-3 by Lot 4-A, Psd-13-007744; on the W., along lines 3-4-5 by Lot 5-B, to 5-C, Psd-13-007744; and on the N., along line 5-6 by Lot 4-C, Psd-13-007744. Beginning at a point marked "1" on the Plan being S., 14 deg. 33'E., 19578.82m from BLLM No 1, Q-88, thence:

S. 10 deg. 11'E.,	174.98 m	to point 2;
S. 79 deg. 49'W.,	66.66 m	to point 3;
N. 10 deg. 11'W.,	174.98 m	to point 4;
N. 10 deg. 11'W.,	50.04 m	to point 5;
N. 79 deg. 49'E.,	66.66 m	to point 6;
S. 10 deg. 11'E.,	50.04 m	to point of;

containing an area of FIFTEEN THOUSAND (15,000) SQUARE METERS, more or less.

1.11. **Brgy. Baan, Km. 3** (TCT No. RT-52643) - A parcel of land (Lot 4-C, Psd-13-007744, being a portion of Lot 4 & 5, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along line 1-2 by Lot 190, Q-88; on the S., along line 2-3 by Lot 4-B, Psd-13-007744; on the W., along line 3-4 by Lot 5-C to 5-D, Psd-13-007744; and on the N., along line 4-1 by Irrigation Canal. Beginning at a point

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC, Project Director, MFCDP II, DPWH

LORDEN C. ISMANOS
City Gov't. Department Head II, CHDO

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Represented by:

RAFAEL C. YABUT
Undersecretary for PMO Operations, DPWH

marked "1" on the Plan being S., 14 deg. 36'E., 19368.63m from BLLM No 1, Q-88, thence:

S. 10 deg. 11'E.,	160.77 m	to point 2;
S. 79 deg. 49'W.,	66.66 m	to point 3;
N. 10 deg. 11'W.,	156.31 m	to point 4;
N. 75 deg. 59'E.,	66.82 m	to point of;

containing an area of TEN THOUSAND FIVE HUNDRED SEVENTY(10,570) SQUARE METERS, more or less.

1.12. **Brgy. Baan, Km. 3** (TCT No. RT-53697) - A parcel of land (Lot 4-A, Psd-13-007744, being a portion of Lot 4 & 5, Pcs-10-000573) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the S., along line 1-2 by Silvero F. Garcia; on the W., along lines 2-3-4 by Lot 5-A to 5-B, Psd-13-007744; on the N., along line 4-5 by Lot 4-B, Psd-13-007744; and on the E., along lines 5-6-1 by Lot 190, Q-88. Beginning at a point marked "1" on the Plan being S., 14 deg. 28'E., 19977.58m from BLLM No 1, Q-88, thence:

S. 79 deg. 49'W.,	66.66 m	to point 2;
N. 10 deg. 11'W.,	200.00 m	to point 3;
N. 10 deg. 11'W.,	25.02 m	to point 4;
N. 79 deg. 49'E.,	66.66 m	to point 5;
S. 10 deg. 11'E.,	25.02 m	to point 6;
S. 10 deg. 11'E.,	200.00 m	to point of;

containing an area of FIFTEEN THOUSAND (15,000) SQUARE METERS, more or less.

1.13. **Brgy. Taguibo** (TCT No. RT-39161) - A parcel of land (Lot 141-E, of the subdivision plan (LRC) Psd-233476, being a portion of 141, Butuan Cad-Q-88 L.R.C. Pat.) situated in the Barrio of Ampayon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the W., N., & E., along lines 1-2-3-4 by Lot 141-B of the subdivision; and on the S., along line 4-1 by property of Lorenzo C. Atega. Beginning at a point marked "1" on the Plan being S., 23 deg. 54'E., 18078.30m from BLLM No 1, Mp. Of Cabadbaran, thence:

N. 02 deg. 07'E.,	100.00 m	to point 2;
S. 87 deg. 53'E.,	100.00 m	to point 3;
S. 02 deg. 07'W.,	100.00 m	to point 4;
N. 87 deg. 53'W.,	100.00 m	to point of;

containing an area of TEN THOUSAND (10,000) SQUARE METERS, more or less.

1.14. **Brgy. Taguibo** (TCT No. RT-39518) - A parcel of land (Lot 141-E-6-C-2, Psd-10-014275, being a portion of Lot 141-B-6-C, Psd-10-008385) situated in the Barrio of Taguibo, City of Butuan, Province of Agusan del Norte, Island of Mindanao.

Signed in the Presence of:

BOGELIO Q. ANG, CEO VI
Old Project Director, MFCDP II, DPWH

LORDEN G. VISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

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City Mayor

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Undersecretary for PMO Operations, DPWH

Bounded on the N., along line 14-15 by Lot 141-D, along line 15-1 by Lot 141-C, both of (LRC) Psd-233476; on the E., along line 1-2 by Lot 141-B-6-C-1, of the subdivision plan Psd-10-014275; on the SE., along lines 2-3-4-5-6-7-8 by Lot 141-A, (LRC) Psd-233476; on the S., along line 8-9 by Lot 143, Q-88, Butuan Cadastre, along lines 9-10-11-12 by Lot 141-E, (LRC) Psd-233476, along line 12-13 by Lot 143, Q-88, Butuan Cadastre; on the W., along line 13-14 by Lot 141-B-6-B, Psd-10-008385. Beginning at a point marked "1" on the Plan being S., 25 deg. 17'E., 18131.95m from BLLM No 1, Mp. Of Cabadbaran, thence:

S. 03 deg. 12'W.,	2.50 m	to point 2;
S. 03 deg. 09'W.,	54.91 m	to point 3;
S. 51 deg. 00'W.,	30.00 m	to point 4;
S. 61 deg. 00'W.,	61.30 m	to point 5;
N. 69 deg. 15'W.,	59.50 m	to point 6;
S. 83 deg. 12'W.,	67.51 m	to point 7;
S. 12 deg. 18'W.,	12.43 m	to point 8;
N. 07 deg. 53'W.,	127.82 m	to point 9;
N. 02 deg. 07'E.,	100.00 m	to point 10;
N. 87 deg. 53'W.,	100.00 m	to point 11;
S. 02 deg. 07'W.,	100.00 m	to point 12;
N. 87 deg. 53'W.,	151.40 m	to point 13;
N. 02 deg. 07'W.,	112.50 m	to point 14;
S. 87 deg. 53'E.,	314.36 m	to point 15;
S. 87 deg. 53'E.,	266.23 m	to point of;

containing an area of FIFTY-ONE THOUSAND TWO HUNDRED SIXTY-FOUR (51,264) SQUARE METERS, more or less.

1.15. **Brgy. Cabcabon** (TCT No. T-18210) - A parcel of land (Lot 4, Pcs-10-000229, being a portion of Lot 744, Cad. 84 and Lot 494-C (LRC) Psd-40378) situated in the Barrio of Cabcabon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along 6-1 by Lot 3; on the S., along line 1-2 by Lot 6, along line 2-3 by Lot 5, all of the consolidation-subdivision plan Pcs-10-000229; o the E., along line 3-4-5 by Propose Road; on the N., along line 5-6 by Lot 71, Cad. 84, Butuan Cadastre. Beginning at a point marked "1" on the Plan being N., 66 deg. 40'W., 661.71m from BLLM No 14, Cad. 84, thence:

N. 87 deg. 53'W.,	79.06 m	to point 2;
N. 87 deg. 53'W.,	167.76 m	to point 3;
N. 02 deg. 07'E.,	70.62 m	to point 4;
N. 02 deg. 07'E.,	85.17 m	to point 5;
S. 87 deg. 53'E.,	246.84 m	to point 6;
S. 02 deg. 07'E.,	155.79 m	to point of;

containing an area of THIRTY-EIGHT THOUSAND FOUR HUNDRED FIFTY-TWO (38,452) SQUARE METERS, more or less.

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
Old Project Director, MFCDP II, DPWH

LORDEN G. ISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL F. YABUT
Undersecretary for PMO Operations, DPWH

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN G. VILMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

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Undersecretary for PMO Operations, DPWH

1.16 **Brgy Cabcabon** (TCT No. 31081) - A parcel of land (Lot 3, Pcs-100229, being a portion of Lot 494-C, (LRC) Psd-40378) situated in the Barrio of Cabcabon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the N., along line 3-4 by Lot 4; on the E., along line 4-5 by Lot 6, both of the consolidation-subdivision plan Pcs-10-000229; on the S., along line 5-1 by proposed road; on the W., along line 1-2-3 by proposed road. Beginning at a point marked "1" on the Plan being N., 87 deg. 122'W., 863.74m from BLLM No 14, Cad. 84, thence:

N. 02 deg. 07'E.,	185.00 m	to point 2;
N. 02 deg. 07'E.,	44.21 m	to point 3;
S. 87 deg. 53'E.,	167.76 m	to point 4;
S. 02 deg. 07'W.,	229.21 m	to point 5;
N. 87 deg. 53'W.,	167.78 m	to point of;

containing an area of THIRTY-EIGHT THOUSAND FOUR HUNDRED FIFTY-FIVE (38,455) SQUARE METERS, more or less.

1.17 **Brgy. Cabcabon** (TCT No. T-29763) - A parcel of land (Lot 6-A, Psd-13-006437 portion of Lot 6, Pcs-10-000229) situated in the Barrio of Cabcabon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the W., along line 1-2 by Lot 5, Pcs-10-000229; on the N., along line 2-3 by Lot 4, Pcs-10-000229; on the E., along line 3-4 by Lot 3, Pcs-10-000229; and on the S., along line 4-1 by Lot 6-B, Psd-13-006437. Beginning at a point marked "1" on the Plan being N., 71 deg. 49'W., 724.18m from BLLM No 14, Cad. 84, Butuan Cadastre; to corner + "1", thence:

N. 02 deg. 07'E.,	39.12 m	to point 2;
S. 87 deg. 53'E.,	79.06 m	to point 3;
S. 02 deg. 07'W.,	39.12 m	to point 4;
N. 87 deg. 53'W.,	79.06 m	to point of;

containing an area of THREE THOUSAND NINETY-THREE (3,093) SQUARE METERS, more or less.

1.18 **Brgy. Cabcabon** (TCT No. RT-39402) - A parcel of land (Lot 74-G, Psd-10-005739, being a portion of Lot 74, Cad. 84, Butuan Cadastre) situated in the Barrio of Cabcabon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the W., along line 3-4 by Lot 74-F, along line 4-5 by Lot 74-D; on the N., along lines 5-6-1 by Lot 74-I, along line 1-2 by Lot 74-H, all of the subdivision plan Psd-10-005739; on the S., along line 2-3 by Lot 73, Cad. 84, Butuan Cadastre. Beginning at a point marked "1" on the Plan being S., 19 deg. 57'W., 412.96m from BLLM No 11, Cad. 84, Butuan Cadastre, thence:

S. 02 deg. 07'W.,	100.00 m	to point 2;
N. 87 deg. 53'W.,	175.00 m	to point 3;
N. 02 deg. 07'W.,	100.00 m	to point 4;

N. 02 deg. 07'W.,	14.29 m	to point 5;
S. 87 deg. 53'E.,	175.00 m	to point 6;
S. 02 deg. 07'W.,	14.29 m	to point of;

containing an area of TWENTY THOUSAND (20,000) SQUARE METERS, more or less.

1.19 **Brgy. Cabcabon** (TCT No. T-28199) - A parcel of land (Lot 73-D, Csd-13-001327-D, 3330, Cad. 84) situated in the Barrio of Cabcabon, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the N., along line 1-2 by Lot 74, Cad. 84; on the E., along line 2-3 by Road; on the S., along line 3-4 by Lot 72, Cad. 84; on the W., along line 4-1 by Lot 73-C, Csd-13-001327-D. Beginning at a point marked "1" on the Plan being N., 15 deg. 22'W., 1043.55m from BLLM No 14, Cad. 84, Butuan Cadastre, thence:

S. 87 deg. 53'E.,	250.00 m	to point 2;
S. 02 deg. 07'W.,	200.00 m	to point 3;
N. 87 deg. 53'W.,	250.00 m	to point 4;
N. 02 deg. 07'E.,	200.00 m	to point of;

containing an area of TWENTY THOUSAND (20,000) SQUARE METERS, more or less.

1.20 **Brgy. Tiniwisan** (TCT No. T-19594) - A parcel of land (Lot 16-B-2-B-6, Psd-10-010140, being a portion of Lot 16-B-2-B, Psd-10-006423) situated in the Barrio of Tiniwisan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the SE., along line 4-5 by Lot 16-B-2-B-1, along line 5-1 by Lot 16-B-2-B-2; on the SW., along line 1-2 by Lot 16-B-2-B-8; on the NW., along line 2-3 by Lot 16-B-2-B-5, all of the subdivision plan Psd-10-010140; on the NE., along line 3-4 by Lot 17, Cad. 84, Butuan Cadastre. Beginning at a point marked "1" on the Plan being S., 01 deg. 49'E., 366.38m from BLLM No 13, Cad. 84, Butuan Cadastre, thence:

N. 10 deg. 11'W.,	100.01 m	to point 2;
N. 79 deg. 49'E.,	100.00 m	to point 3;
S. 10 deg. 11'E.,	100.00 m	to point 4;
S. 79 deg. 49'W.,	50.00 m	to point 5;
S. 79 deg. 49'W.,	50.00 m	to point of;

containing an area of TEN THOUSAND (10,000) SQUARE METERS, more or less.

1.21 **Brgy. Tiniwisan** (TCT No. T-19647) - A parcel of land (Lot 16-B-2-B-5, Psd-10-010140, being a portion of Lot 16-B-2-B, Psd-10-006423) situated in the Barrio of Tiniwisan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the SE., along line 3-4 by Lot 16-B-2-B-6; on the SW., along line 4-1 by Lot 16-B-2-B-7, both of the subdivision plan Psd-10-010140; on the NW., along line 1-2 by Lot 16-B-2-A, Psd-10-006423; on the NE., along line 2-3

Signed in the Presence of:

ROGELIO Q. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN O. VISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL C. YABUT
Undersecretary for PMO Operations, DPWH

marked "1" on the Plan being S., 07 deg. 59'W., 171.01m from BLLM No 13, Cad. 84, Butuan Cadastre, thence:

N. 79 deg. 49'E.,	100.00 m	to point 2;
S. 10 deg. 11'E.,	100.00 m	to point 3;
S. 79 deg. 49'W.,	100.00 m	to point 4;
N. 10 deg. 11'W.,	100.00 m	to point of;

containing an area of NINE THOUSAND NINE HUNDRED NINETY-NINE (9,999) SQUARE METERS, more or less.

1.22 **Brgy. Tiniwisan** (TCT No. T-29242) - A parcel of land (Lot 16-B-2-B-1, Psd-10-010140, being a portion of Lot 16-B-2-B, Psd-10-006423) situated in the Barrio of Tiniwisan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the NE., along line 1-2 by Lot 17, Cad. 84; on the SE., along line 2-3 by Lot 16-A, (LRC) Psd-260504; on the SW., along line 3-4 by Lot 16-B-2-B-2; on the NW., along line 4-1 by Lot 16-B-2-B-6, both of the subdivision plan. Beginning at a point marked "1" on the Plan being S., 17 deg. 31'E., 365.48m from BLLM No 13, Cad. 84, Butuan Cadastre, thence:

S. 10 deg. 11'E.,	200.00 m	to point 2;
S. 79 deg. 49'W.,	50.00 m	to point 3;
N. 10 deg. 11'W.,	200.00 m	to point 4;
N. 79 deg. 49'E.,	50.00 m	to point of;

containing an area of TEN THOUSAND (10,000) SQUARE METERS, more or less.

1.23 **Brgy. Tiniwisan** (TCT No. T-29728) - A parcel of land (Lot 16-B-2-A-2, Psd-13-006842, being a portion of Lot 16-B-2-A, Psd-10-006423) situated in the Barrio of Tiniwisan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along line 5-6 by Lot 17, Cad. 84; on the S., along line 6-1 by Lot 16-B-2-B, Psd-10-006423; on the W., along line 1-2 by Lot 16-B-1, Psd-10-002544; on the N., along line 2-3 by Lot 16-B-2-A-1, Psd-13-006842, along line 3-4 by Lot 16-B-2-A-4, Psd-13-006842, along line 4-5 by Lot 16-B-2-A-3, Psd-13-006842. Beginning at a point marked "1" on the Plan being S., 07 deg. 59'W., 171.01m from BLLM No 13, Cad. 84, Butuan Cadastre, thence:

N. 10 deg. 11'W.,	100.00 m	to point 2;
N. 79 deg. 49'E.,	47.00 m	to point 3;
N. 79 deg. 49'E.,	10.00 m	to point 4;
N. 79 deg. 49'E.,	43.00 m	to point 5;
S. 10 deg. 11'E.,	100.00 m	to point 6;
S. 79 deg. 49'W.,	100.00 m	to point of;

containing an area of TEN THOUSAND (10,000) SQUARE METERS, more or less.

Signed in the Presence of:

ROGELIO Q. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN A. VISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL C. YABUT
Undersecretary for PMO Operations, DPWH

1.24 **Brgy. Tiniwisan** (TCT No. T-29243) - A parcel of land (Lot 16-B-2-B-2, Psd-10-010140, being a portion of Lot 16-B-2-B, Psd-10-006423) situated in the Barrio of Tiniwisan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the NW., along line 1-2 by Lot 16-B-2-B-6; on the NE., along line 2-3 by Lot 16-B-2-B-1, both of the subdivision plan; on the SE., along line 3-4 by Lot 16-A (LRC) Psd-260504; on the SW., along line 4-1 by Lot 16-B-2-B-3, of the subdivision plan. Beginning at a point marked "1" on the Plan being S., 01 deg. 49'E., 366.38m from BLLM No 13, Cad. 84, Butuan Cadastre, thence:

N. 79 deg. 49'E.,	50.00 m	to point 2;
S. 10 deg. 11'E.,	200.00 m	to point 3;
S. 79 deg. 49'W.,	50.00 m	to point 4;
N. 10 deg. 11'W.,	200.00 m	to point of;

containing an area of TEN THOUSAND (10,000) SQUARE METERS, more or less.

1.25 **Brgy. Mahay** (TCT No. RT-38399) - A parcel of land situated in the Barrio of Baan, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., by Obod-obod Creek; on the S., & SW by property claimed by Antonio Bustillo; on the NW., by property claimed by Geronimo cupay. Beginning at a point marked "1" on the Plan F-19792 being N., 75-19'E., 1115.03m from BLLM No. 4, Butuan Cad. 84, thence:

N. 29 deg. 59'W.,	462.40 m	to point 2;
N. 76 deg. 43'E.,	332.13 m	to point 3;
N. 50 deg. 40'E.,	4.53 m	to point 4;
S. 03 deg. 34'E.,	106.28 m	to point 5;
N. 81 deg. 11'W.,	57.20 m	to point 6;
S. 12 deg. 09'E.,	60.79 m	to point 7;
S. 55 deg. 59'E.,	70.29 m	to point 8;
S. 55 deg. 35'W.,	87.14 m	to point 9;
S. 79 deg. 52'E.,	70.18 m	to point 10;
S. 30 deg. 58'E.,	41.97 m	to point 11;
S. 05 deg. 21'W.,	26.64 m	to point 12;
S. 76 deg. 00'W.,	50.01 m	to point 13;
S. 00 deg. 07'E.,	131.23 m	to point 14;
N. 87 deg. 32'W.,	2.87 m	to point 15;
S. 82 deg. 24'W.,		to point of;

containing an area of NINETY-FOUR THOUSAND THREE HUNDRED TWENTY-SIX (94,326) SQUARE METERS, more or less.

1.26 **Brgy.Tagabaca** (TCT No. RT-56612)- A parcel of land (Lot 3, Psd-13-00972, being a portion of Lot 1-B-1, 1-B-2, 1-B-3, Psd-13-002933) situated in the Barrio of Tagabaca, City of Butuan, Province of Agusan del Norte, Island of Mindanao. Bounded on the E., along lines 1-2-3-4 by Lot 1-D, Psu-10-

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN G. VISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL C. YABUT
Undersecretary for PMO Operations, DPWH

000900 AMD (OLT) & Emelio Borja; on the S., along lines 4-5-6 by Lot B-2, Psd-10-00202-018445; on the W., along lines 6-7-8-9-10 by Lot 2, Psd-13-000972; and on the N., along lines 10-11-1 by Lot 1-A, Psu-10-000900 AMD (OLT). Beginning at a point marked "1" on the Plan being N., 88 deg. 25'E., 941.00m from BLLM No 6, Cad. 84, Butuan Cadastre, thence:

1-2	S.,	04 deg. 20' E.,	20.00 m.
2-3	N.,	81 deg. 15' E.,	20.00 m.
3-4	S.,	04 deg. 20' E.,	60.48 m.
4-5	S.,	82 deg. 21' W.,	130.89 m.
5-6	S.,	82 deg. 21' W.,	13.49 m.
6-7	N.,	01 deg. 59' E.,	22.20 m.
7-8	N.,	01 deg. 30' W.,	19.91 m.
8-9	N.,	02 deg. 30' W.,	19.91 m.
9-10	N.,	03 deg. 30' W.,	16.20 m.
10-11	N.,	81 deg. 15' E.,	12.26 m.
11-1	N.,	81 deg. 15' E.,	107.99 m.

Containing an area of TEN THOUSAND SEVEN HUNDRED SEVENTY-FIVE (10,775) sq.m. more or less.

Signed in the Presence of:

ROGELIO O. ANG, CEO VI
OIC-Project Director, MFCDP II, DPWH

LORDEN G. ISMANOS
City Gov't. Department Head II, CHDO

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

2 The CITY per Sanguniang Panlungsod Resolution No. 722-2011 dated November 21,2011, hereto attached as ANNEX "A" hereby accepts the transfer and conveyance of the parcels of land herein described, including pertinent documents;

3 The DPWH shall turn-over to the CITY Transfer Certificate of Title Nos. of twenty six lots (26) as described, together with all other pertinent documents;

4 The CITY shall cause and bear all the necessary expenses for the transfer of title in its favor;

5 The CITY shall in coordination with the National Housing Authority (NHA) and other National Government Agencies (NGA's), Private Sectors (PS) and Non Government Organizations (NGO's) cause to undertake the necessary development and improvements of said lots for the disposition and award of the individual lots to qualified and legitimate beneficiaries in accordance with its housing programs & policies which are deemed appropriate.

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

RAFAEL V. YABUT
Undersecretary for PMO Operations, DPWH

IN WITNESS WHEREOF, the PARTIES have hereunto set their hands in _____ this _____ day of _____, 20__.

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

By:

RAFAEL C. YABUT
Undersecretary for PMO Operations

CITY GOVERNMENT OF BUTUAN

By:

FERDINAND M. AMANTE, JR.
City Mayor

SIGNED IN THE PRESENCE OF:

ROGELIO O. ANG, CEO VI
OIC-Project Director
PMO-MFCDP, Cluster II

LORDEN G. VISMANOS
City Gov't. Department Head II, CHDO

Approved:

ROGELIO L. SINGSON
Secretary
DPWH

WIN2V10247

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)
) s.s
.....)

Before me a Notary Public and in the City of Butuan 16th day of January, 2012, personally appeared to me **RAFAEL C. YABUT,** with his Community Tax Certificate No. 30336318, issued on JANUARY 05, 2012, Issued at ANGELES CITY, and **FERDINAND M. AMANTE JR.** with his Community Tax Certificate No. 00714710, Issued on Jan. 03, 2012, Issued at Butuan City, known and to be the same persons who executed the foregoing instrument the acknowledgement is written and acknowledged to me that the same is their free act and voluntary deed.

WITNESS MY HAND AND SEAL.

Book No. III
Page No. 25
Doc. No. 244
Series of 2012

ATTY. ANNA LIZA L. GONZALES
NOTARY PUBLIC
COMMISSION VALID UNTIL DECEMBER 31, 2012
ROLL NO. 39782
PTR NO. 0402280/01-02-12/BUTUAN CITY
IBP NO. 846378 / 01-02-12/BUTUAN CITY

AMENDMENT NO. 2 TO THE MEMORANDUM OF AGREEMENT

KNOW ALL MEN BY THESE PRESENTS;

This 2nd Amendment to the Memorandum of Agreement is made and entered into by and between:

The Republic of the Philippines through the Department of Public Works and Highways (DPWH) represented therein by **ROGELIO O. ANG,** OIC, Project Director Major Flood Control and Drainage Project (MFCDP) Cluster II, Project Management Office(PMO) who is duly authorized for this purpose with office address at DPWH, NCR Compound, 2nd Street, Del Pan, Port Area, Manila, hereinafter referred to as the DPWH;

--- and ---

The CITY GOVERNMENT of Butuan City, represented herein by the incumbent City Mayor, FERDINAND M. AMANTE, JR. who is duly authorized this purpose with office address at City Hall, Butuan City, hereinafter referred to as the CITY.

Signed in the Presence of:

SERGIO M. MULAWAN, JR
Engineer III/ARBDP-PMO, DPWH

ROGELIO C. BALOCAEL
OIC - City Engineer

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Represented by:

ROGELIO O. ANG, CEO VI
OIC-Project Director
PMO-MFCDP, Cluster II, DPWH

CITY GOVERNMENT OF BUTUAN

Represented by:

FERDINAND M. AMANTE, JR.
City Mayor

WITNESSETH:

WHEREAS, the parties have/had signed the subsisting Amendment to the MEMORANDUM OF AGREEMENT duly approved by HERMOGENES E. EBDANE JR. DPWH, Secretary, more particularly described under document number 179, page 18, book 5, series of 2007 of the notarial register of Atty. Hedeliza O.Hormachuelos- Cruz, notary public, for and in Butuan City, a machine copy of which is attached as annex "A-1";

WHEREAS, the parties hereto during the conference held with Japan International Cooperation Agency (JICA) last March 17, 2011 at City Hall, Butuan City. Re: Consultation Meeting with NIA, DPWH, and LGU officials on the Lower Agusan Development Project, Phase II-Flood Control Component (LADP-FC-II) have agreed to further amend some salient provision of paragraph 1 and 2 more specifically the listed and the completed structures of LADP-FC-II for turn over to the City Government of Butuan for subsequent maintenance thereof under Annex "B" of the amended MOA for reason of funding constraint that the city shall take responsibility.

NOW HEREFORE the parties hereto agree as follows:

1. The CITY shall accept from DPWH the following completed structures of
   Urban Drainage System in Butuan City, LADP-FC-II, viz:

   1.1 T. Calo – Suatan – Masao Channel with length of 6.2 Kilometers
   1.2 Doongan Creek with channel length of 1.4 kilometers
   1.3 Sosompit Creek with a channel length of 1.4 kilometers

   Which are practically situated within the city proper of Butuan together with their corresponding SLUICES (Item C), RC box Culverts (Item D) lateral drainage pipes (Item E) and its road pipe culverts (Item F).

For this purpose a more detailed and tabulated schedule of completed structures of LADP-FC-II for turn over and maintenance of the City Government of Butuan, and those completed structures that will be retained by DPWH is hereby prepared as the Annex (A-2) of this agreement to delineate the specific duties and responsibilities of the parties concerned. For guidance of the City the estimates for annual requirement for O & M under its responsibility is provided as Annex A-3.

2. Any and all items of the former amendment of the MOA which are not inconsistent with the terms and conditions of this 2nd amendment to the MOA shall be deemed binding and part of this Agreement.

3. These amendments shall become valid and effective upon approval thereof by the Honorable Secretary of the DPWH.

IN WITNESS WHEREOF, the parties hereto have signed this ___ day of _____ in Butuan City, Philippines.

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

By:

ROGELIO O. ANG, CEO VI
OIC, Project Director
MFCDP, Cluster II

CITY GOVERNMENT OF BUTUAN

By:

FERDINAND M. AMANTE, JR.
City Mayor

SIGNED IN THE PRESENCE OF:

SERGIO M. MULAWAN, JR.
Engineer III, CARBDP-PMO

ROGELIO L. BATOCAEL
OIC - City Engineer

APPROVED BY:

ROGELIO L. SINGSON
DPWH Secretary

WIN2V10571

ACKNOWLEDMENT

REPUBLIC OF THE PHILIPPINES)
CITY OF BUTUAN .....) s.s.

Before me a Notary Public and in the City of Butuan _____ day of _____, 2011, personally appeared to me **ROGELIO O. ANG** with his Community Tax Certificate No. 14344646, issued in Butuan City on 1-25, 2012, and **FERDINAND M. AMANTE, JR. M.D.** with his Community Tax Certificate No 009147 issued in Butuan City on Jan 3, 2012, 2011, known to me and to be the same persons who executed the foregoing instrument including this page where acknowledgement is written and that the same is their free act and voluntary deed.

WITNESS MY HAND AND SEAL.

Doc. No. 180
Page No. 18
Book No. 10
Series No: 2012

ATTY. ANNA LIZA L. GONZALES
NOTARY PUBLIC
COMMISSION VALID UNTIL DECEMBER 31, 2012
ROLL NO. 39782
PTR NO. 0402283/01-02-12/BUTUAN CITY
IBP NO. 846378/01-02-12/BUTUAN CITY

ANNEX "A-2"

LOWER AGUSAN DEVELOPMENT PROJECT, STAGE I, PHASE II

List of structures turned-over to the City of Butuan as per approved amendment to the Memorandum of Agreement by Secretary Hermogenes E. Ebdane, Jr., DPWH Secretary		Revised list of structures to be turned-over to the City of Butuan as a result of consultation meeting with CAREDP, DPWH and LGU officials of Butuan City		Remarks
I. East Bank Flood Control Facilities				
1 East Bank Levee	12.1 km.			CARSDP-DPWH
2 Cut-off Channel	6.2 km.			CARSDP-DPWH
3 Maug Creek Drainage Sluice	2.5 m. (W) x 3.0 m (H) x 1 lane			CARSDP-DPWH
4 Mahay Creek Drainage Sluice	2.5 m. (W) x 3.0 m (H) x 1 lane			CARSDP-DPWH
5 Banza River Navigation Sluice	5.0 m. (W) x 5.5 m (H) x 2 lanes			CARSDP-DPWH
6 Tumampi Vehicular Bridge	4.5 m (W) x (15 m + 18 m + 15 m span)			CARSDP-DPWH
7 Improvement of Banza River	6.2 km.			CARSDP-DPWH
8 Banza Pedestrian Bridge	2.15 m (W) x 18.0 m (L) x 4			CARSDP-DPWH
9 Initial Resettlement Area (IRA)	415 housing units on a 7.8 ha. Land (under separate MOA)			Separate MOA
II. Masao River Improvement and Construction of Urban Drainage System in Butuan City (West Bank)		II. Masao River Improvement and Construction of Urban Drainage System in Butuan City (West Bank)		
A. Improvement of Masao River				
1 Channel Length	5.45 km			
B. Improvement of Urban Drainage System (Butuan City)		B. Improvement of Urban Drainage System (Butuan City)		
1 T. Calo-Suatan-Masao Channel	6.2 km.	1 T. Calo-Suatan-Masao Channel	6.2 km.	
2 Doongan Creek	1.4 km.	2 Doongan Creek	1.4 km.	
3 Mandacpan-Bonbon Channel	3.7 km.			CAREDP-DPWH
4 Libertad-Masao River	2.9 km.			CAREDP-DPWH
5 Sosompit Creek	1.4 km.	3 Sosompit Creek	1.4 km.	
6 Middle Reach (Mandacpan-Libertad Bridg	3.2 km			CAREDP-DPWH
C. Sluices		C. Sluices		
1 T. Calo-Suatan-Masao River		1 T. Calo-Suatan-Masao River		
a) Lower T. Calo		a) Lower T. Calo		
a.1) STCM1-R1 @ TCM 2+225.00 (Type "E")		a.1) STCM1-R1 @ TCM 2+225.00 (Type "E")		
a.2) STCM1-R2 @ TCM 1+920.00 (Type "C")		a.2) STCM1-R2 @ TCM 1+920.00 (Type "C")		
a.3) STCM1-R3 @ TCM 1+710.00 (Type "C")		a.3) STCM1-R3 @ TCM 1+710.00 (Type "C")		
a.4) STCM1-L1 @ TCM 1+391.00 (Type "A")		a.4) STCM1-L1 @ TCM 1+391.00 (Type "A")		
a.5) STCM1-L2 @ TCM 2+010.00 (Type "C")		a.5) STCM1-L2 @ TCM 2+010.00 (Type "C")		
a.6) STCM1-L3 @ TCM 2+195.00 (Type "E")		a.6) STCM1-L3 @ TCM 2+195.00 (Type "E")		
a.7) STCM1-L4 @ TCM 0+848.00 (Type "C")		a.7) STCM1-L4 @ TCM 0+848.00 (Type "C")		
a.8) STCM1-L5 @ TCM 1+848.00 (Type "C")		a.8) STCM1-L5 @ TCM 1+848.00 (Type "C")		
a.9) STCM1-L6 @ TCM 0+435.00 (Type "E")		a.9) STCM1-L6 @ TCM 0+435.00 (Type "E")		
b)		b)		
b.1) STCMm-L1 @ TCM 3+200.00 (Type "C")		b.1) STCMm-L1 @ TCM 3+200.00 (Type "C")		
b.2) STCMm-L2 @ TCM 3+856.00 (Type "D")		b.2) STCMm-L2 @ TCM 3+856.00 (Type "D")		
b.3) STCMm-L3 @ TCM 3+450.00 (Type "C")		b.3) STCMm-L3 @ TCM 3+450.00 (Type "C")		
b.4) STCMm-R1 @ TCM 2+970.43 (Type "D")		b.4) STCMm-R1 @ TCM 2+970.43 (Type "D")		
b.5) STCMm-R2 @ TCM 3+627.37 (Type "D")		b.5) STCMm-R2 @ TCM 3+627.37 (Type "D")		
b.6) STCMm-R3 @ TCM 3+505.00 (Type "A")		b.6) STCMm-R3 @ TCM 3+505.00 (Type "A")		
c)		c)		
c.1) STCMU-R1 @ TCM 4+575.25 (Type "A")		c.1) STCMU-R1 @ TCM 4+575.25 (Type "A")		
c.2) STCMU-R2 @ TCM 4+870.32 (Type "A")		c.2) STCMU-R2 @ TCM 4+870.32 (Type "A")		
c.3) STCMU-R3 @ TCM 4+250.00 (Type "D")		c.3) STCMU-R3 @ TCM 4+250.00 (Type "D")		
c.4) STCMU-R4 @ TCM 5+870.00 (Type "A")		c.4) STCMU-R4 @ TCM 5+870.00 (Type "A")		
c.5) STCMU-R5 @ TCM 5+043.00 (Type "A")		c.5) STCMU-R5 @ TCM 5+043.00 (Type "A")		
c.6) STCMU-L1 @ TCM 4+446.57 (Type "A")		c.6) STCMU-L1 @ TCM 4+446.57 (Type "A")		
c.7) STCMU-L2 @ TCM 4+943.08 (Type "A")		c.7) STCMU-L2 @ TCM 4+943.08 (Type "A")		
c.8) STCMU-L3 @ TCM 5+039.39 (Type "E")		c.8) STCMU-L3 @ TCM 5+039.39 (Type "E")		
c.9) STCMU-L4 @ TCM 5+358.10 (Type "C")		c.9) STCMU-L4 @ TCM 5+358.10 (Type "C")		
c.10) STCMU-L5 @ TCM 5+742.61 (Type "A")		c.10) STCMU-L5 @ TCM 5+742.61 (Type "A")		
c.11) STCMU-L6 @ TCM 5+997.00 (Type "D")		c.11) STCMU-L6 @ TCM 5+997.00 (Type "D")		
2 Doongan Creek		2 Doongan Creek		
2.1) SDC-R1 @ DC 0+428.28 (Type "E")		2.1) SDC-R1 @ DC 0+428.28 (Type "E")		
2.2) SDC-R2 @ DC 0+135.10 (Type "E")		2.2) SDC-R2 @ DC 0+135.10 (Type "E")		
2.3) SDC-R3 @ DC 0+150.00 (Type "C")		2.3) SDC-R3 @ DC 0+150.00 (Type "C")		
2.4) SDC-R4 @ DC 0+665.50 (Type "C")		2.4) SDC-R4 @ DC 0+665.50 (Type "C")		
2.5) SDC-L1 @ DC 0+084.45 (Type "E")		2.5) SDC-L1 @ DC 0+084.45 (Type "E")		
2.6) SDC-L2 @ DC 0+739.65 (Type "C")		2.6) SDC-L2 @ DC 0+739.65 (Type "C")		
3 Suatan Creek		3 Suatan Creek		
3.1) Suatan Sluice Gate		3.1) Suatan Sluice Gate		
D. R.C Box Culvert		D. R.C Box Culvert		
1 T. Calo-Suatan-Masao River		1 T. Calo-Suatan-Masao River		
a) Lower T. Calo		a) Lower T. Calo		
a.1) BC-TCM2		a.1) BC-TCM2		
b) Middle T. Calo		b) Middle T. Calo		
b.1) BC-TCM3		b.1) BC-TCM3		
c) Upper T. Calo		c) Upper T. Calo		
c.1) BC-TCM4		c.1) BC-TCM4		
c.2) BC-TCM5		c.2) BC-TCM5		
c.3) BC-TCM6		c.3) BC-TCM6		
2 Doongan Creek		2 Doongan Creek		
2.1) BC-DC1		2.1) BC-DC1		
2.2) BC-DC2		2.2) BC-DC2		
3 Langihan Creek		3 Langihan Creek		
3.1) BC-LC1		3.1) BC-LC1		
4 Sosompit Creek		4 Sosompit Creek		
4.1) BS-SC1		4.1) BS-SC1		
E. Lateral Drainage Pipe		E. Lateral Drainage Pipe		
1 Sosompit Creek		1 Sosompit Creek		
1.a) SC-LDP @ 1+000		1.a) SC-LDP @ 1+000		
1.b) SC-LDP @ 0+850		1.b) SC-LDP @ 0+850		
1.c) SC-LDP @ 0+697.63		1.c) SC-LDP @ 0+697.63		
1.d) SC-LDP @ 0+500		1.d) SC-LDP @ 0+500		
1.e) SC-LDP @ 0+250		1.e) SC-LDP @ 0+250		
F. Road Pipe Culverts		F. Road Pipe Culverts		
1 Upper T. Calo-Suatan-Masao River		1 Upper T. Calo-Suatan-Masao River		
1.a) RPC-TCM 5+973		1.a) RPC-TCM 5+973		
2 Doongan Creek		2 Doongan Creek		
2.a) RPC-DC 0+080		2.a) RPC-DC 0+080		

Certified Correct:

ROGELIO O. ANG, CEO VI
OIC - Project Director


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REPUBLIKA NG PILIPINAS
FOUNDATION FOR RURAL ENTERPRISE AND ECOLOGY DEVELOPMENT OF MINDANAO INC.
FREEDOM