Topography

The lowest lowland area is the coastal plain in particular. These areas have extremely low ground level of EL. 0m to EL. 2m compared to the high tide level of about EL. 0.8m from the Mean Sea Level (MSL). These are the city of Bacoor and the municipalities of Kawit, Noveleta and Rosario.

The lowland area consists of the coastal and alluvial plains. These areas have flat ground slope of less than 0.5% and low ground elevation of EL. 2m to EL. 30m. The alluvial plain can be found in the city of Imus and southern part of General Trias. Into these localities forms the transition area between the coastal plain and the central hilly area. It also covers some areas of Bacoor, Kawit, Noveleta, Rosario and Tanza.

Photo credit: Desiree Joy Villanueva

The third topography type is upland mountainous area, found in Amadeo and Tagaytay City. They are situated at a very high elevation above EL. 400m with slopes of more than 2%. The Tagaytay ridge has a peak elevation of 650m.

The last topography type is the central hilly area, generally found on the mountain foot slope. It forms the rolling tuffaceous plateau. This topography includes steep hills, ridges and elevated inland valley. The plateau is characterized with ground elevation ranging from 30m to nearly 400m. Its ground slope ranges from 0.5 to 2%. The cities of Trece Martires and Dasmariñas, and the municipalities of Indang and Silang have this kind of topography.

Land Area

Land is an area of ground which is being used for a particular purpose. It excludes area below inland water bodies. Land is one of the major resources of a province. Cavite covers 8.72% of the CALABARZON's land area. This is relatively small considering that the Region is only comprised of five provinces. The land area of Cavite is equivalent to only 0.48 percent of the total land area of the Philippines which is 299,404.00 hectares. The municipalities of Maragondon and Silang have the biggest land areas comprising 16,549 hectares and 15,641 hectares, respectively while the municipality of Noveleta has the smallest land area of 541 has. or 0.38 percent of the provincial total land area(Table 3.1).

Table 3.1. Land Area by City/Municipality, Province of Cavite: 2010

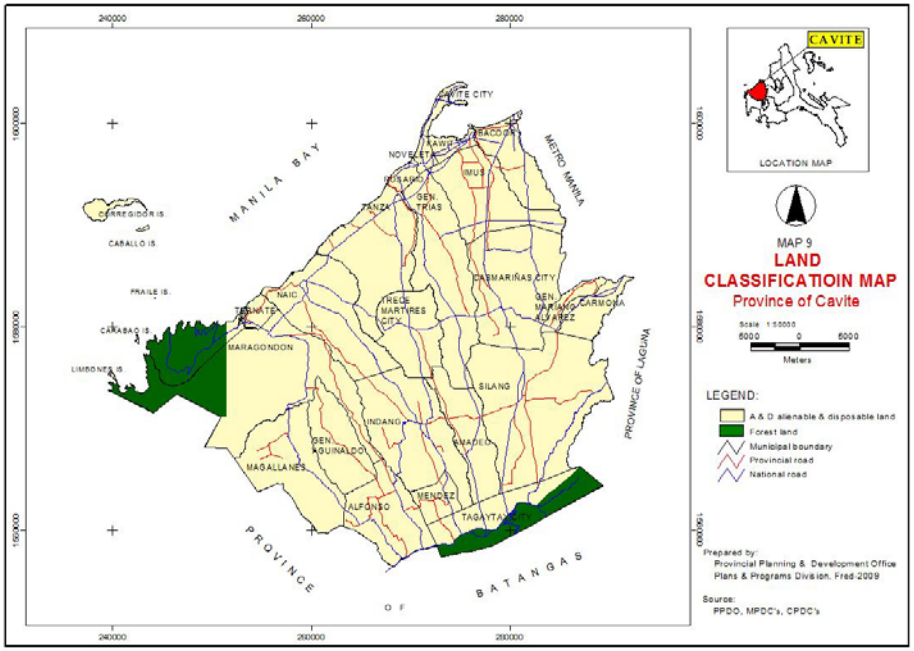
City/Municipality	Land Area (Hectares)	Percent Distribution
1st District		
Cavite City	1,183	0.83
Kawit	1,340	0.94
Noveleta	541	0.38
Rosario	567	0.40
2nd District		
City of Bacoor	5,240	3.67
3rd District		
City of Imus	9,701	6.80
4th District		
Dasmariñas	8,234	5.77
5th District		
Carmona	3,092	2.17
Silang	15,641	10.96
Gen. M. Alvarez	938	0.66
6th District		
TreceMartires City	3,917	2.74
Gen. Trias	11,768	8.25
Tanza	9,630	6.75
Amadeo	4,790	3.36
7th District		
Tagaytay City	6,615	4.64
Alfonso	6,460	4.53
Gen. Emilio Aguinaldo	5,103	3.58
Indang	8,920	6.25
Magallanes	7,860	5.51
Maragondon	16,549	11.60
Mendez	1,667	1.17
Naic	8,600	6.03
Ternate	4,350	3.05
TOTAL	142,706	100.00

Source: Provincial Development and Physical Framework Plan 2011-2020

Land Classification

Planning the distribution of lands plays important role in designing development for any local government unit. It dictates the intended land-use for an area that contributes to a more balanced development.

Land is being classified into two land classifications such as forest lands and alienable and disposable land. Forest lands are being maintained as they play a great role for the ecological balance of the Province. These are protected areas that are home to numerous flora and fauna that need to be guarded and preserved. Correspondingly, the alienable and disposable lands are further classified as built-up areas and production areas. These lands are intended for urban, economic and demographic developments.



Forest Lands

Forest lands are simply described as land with high density of trees. Forests are central to human life because they produce a wide range of resources necessary for human's comfortable living. The vegetation present in a forest promotes carbon reserves that aid in regulating the planetary climate. The presence of the trees also stimulates water purification and it naturally supports in the flood mitigation as well as in the control of damaging effects of natural hazards. The presence of forests also upholds the proliferation of various terrestrial biodiversity.

The existence of forests is threatened by uncontrolled urbanization. Urbanization is something unrelenting to an area as promising as the Province of Cavite. Given this reality, it is a must to safeguard parts of the province which are rich forest lands in order to ensure ecological balance. Cavite lies in the western monsoon forest zone. This location is very beneficial for the formation of tropical rain forests which are characteristically made through natural vegetation.

In 2012 inventory, the existing total forest cover within the province is 57.37 square kilometers (Table 3.1). These forest areas were categorized as Protected Landscape under R.A.7586 otherwise known as National Integrated Protected Area System (NIPAS) and the unclassified forest (Non-NIPAS).

By virtue of Proclamation No. 1594 on 26 October 1976, a total of 3,928.00 hectares located in Ternate and Maragondon, Cavite was proclaimed as national park. It is now known as the Mts. Palay-Palay and Mataas na Gulod Protected Landscape. The park lies in the border of Cavite and Batangas and has three peaks, Palay-Palay, Pico de Loro and Mataas na Gulod. Still, there were five (5) unclassified forests found along Tagaytay Ridge, Maragondon, Magallanes, Ternate and Alfonso (Table 3.2).

Cavite has seven recorded mountains such as Pico de Loro, Mt. Palay-Palay, Mt. Buntis, Mt. Mataas na Gulod, Mt. Nagpatong, Mt. Hulog and Mt. Gonzales (Table 3.3).

The abundance of Cavite with forest reserves provides the variety of different forest products (Table 3.4). One of which is bamboo which can be found mainly in the municipality of Maragondon and parts of Ternate, Magallanes and General Aguinaldo.

Cavite also is a good source of timbers and logs.

Mt. Pico de Loro at Maragondon, Cavite

The DENR Station at the Mt. Palay-Palay/ Mataas na Gulod Protected Landscape, Maragondon, Cavite

Table 3.2. Forest Cover, Province of Cavite: 2012

Total Forest Cover				Forest Cover w/in Forest Land/Timber Land				Forest Cover w/in A & D			
Total	Broad Leaved		Mangrove	Total	Broad Leaved		Mangrove	Total	Broad Leaved		Mangrove
	Closed	Open			Closed	Open			Closed	Open	
57.37	-	54.39	2.98	41.03	-	41.03	-	16.34	-	13.36	2.98

Source: Provincial Environment and Natural Resources Office

Table 3.3. Location and Land Area of Forests, Province of Cavite: 2012

City/Municipality	Type of Forest	Area (Hectares)
Tagaytay City	Unclassified Forest	1,802.900
Magallanes	Unclassified Forest	1,861.000
Ternate	Unclassified Forest	1,248.700
	Classified Forest	1,237.210
Maragondon	Unclassified Forest	2,140.940
	Classified Forest	2,690.790
	TOTAL	8,624.956

Source: Provincial Development and Physical Framework Plan 2011-2020

Table 3.4. Mountains in Cavite by Location

Name	Location
Pico de Loro	Maragondon
Mt. Palay-Palay	Ternate-Maragondon
Mt. Buntis	Maragondon
Mt. Mataas na Gulod	Maragondon
Mt. Nagpatong	Maragondon
Mt. Hulog	Maragondon
Mt. Marami	Magallanes
Mt. Gonzales	Tagaytay City

Source: Department of Environment and Natural Resources-Cavite

Table 3.5. Forest Products by Location, Province of Cavite

Forest Products	Location
Almaciga, Timber, Bamboo rattan, vine, wild plants & animals	Ternate
Timber, Bamboo, Rattan firewood	Magallanes
Bamboo, Usiw, Buho, Rattan Firewood, lumber	Maragondon
Bamboo, Cogon, Rattan, Cabo-negro processed into rope	Gen. Aguinaldo

Source: Department of Environment and Natural Resources-Cavite

Status of Land Use (General)

Land use is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements. It also has been defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it" (Wikipedia).Land use is generally classified into two, forest lands and alienable and disposable lands. These lands are being used in various ways, either for agriculture, residences, open areas, etc.

Land-use is simply defined as the man's activities on land. Based on the Cavite Provincial Physical Framework Plan 2010-2015, Cavite's alienable and disposable lands are further classified into production lands and built-up areas. Production lands in Cavite are intended for agriculture, fishery and mining. On the other hand, built-up areas are mainly for residential areas, commercial, industrial and tourism areas.

Production Land-Use

The production land of Cavite has a total area of 71,474.91 hectares. The entire production land is being used for agriculture and is therefore classified as agricultural lands. The production land-use accounts to 50.09% of the total land area of the province. The presence of a significant portion of the province as agricultural land can lead to the conclusion that Cavite, despite being a center of countryside industrialization, remains to be an agricultural area. The agricultural economy of the province comes in support of the food security efforts of the province (Table 3.6). Some of the major crops being produced in the province are rice, corn, coffee, coconuts, cutflowers and vegetables. At present, land conversion, especially form agricultural to some other uses, is prohibited under the law in order to protect the environment from abuses due to urbanization.

The main players in the agricultural sector are livestock farms that range from piggeries, poultries, goat farms and cattle farms. The climatic suitability of Cavite makes the province ideal for integrated farming, having crops and livestock raising in one farm. These livestock farms are very promising industry considering the demand for food of the Cavite population. The crop industry is also a consistent component of the agricultural economy.

Fishery is also another major component of the agricultural sector. Having rich marine resources and long coastlines, the province is home to numerous fishery activities. This industry has provided livelihood to many Caviteños. In some lowland and even upland areas, fishery, in the form of fishponds are also producing considerable amount of fish products. Some areas in Cavite are also engaged in fish processing and production of fish products like fish sauce.

Mining is the third component of production land-use in the province. Extraction includes filling materials, gravel and sand. Currently, there are 21 licensed quarry operators in Cavite (Table 3.7).

Built-up Areas

The area intended for settlements and industries are called built-up areas. This area also becomes the hub for commercial and business establishments. According to the 2010 Census of Population and Housing by the National Statistics Office, there are 849,755 occupied housing units in Cavite and given the trend will continually increase gradually.

Moreover, according to the Housing and Land-Use Regulatory Board, there are around 1,392 different housing subdivisions with issued license to sell in the province until 2012.

Meanwhile, the industrial sector also develops rapidly in the Province. In the year 2012, industrial estates cover around 3,093.0165 hectares of land. Tourism establishments are also considered built-up areas such as golf courses, leisure farms, resorts and the likes.

Plantation Hills at Tagaytay Highlands – A high-end residential and farm estate in the Tagaytay City

Table 3.6. Land Area Classification by City/Municipality, Province of Cavite: 2012

City/Municipality	Total Area of Production Land(Hectares)	Total Area of Protection Land(Hectares)	Total Built-up Area (Hectares)	Island	Total Area (Hectares)
1st District					
Cavite City			573.63	609.37	1,183.00
Kawit	450.00		888.00	2.00	1,340.00
Noveleta	54.00		487.00		541.00
Rosario	27.00		540.00		567.00
2nd District					
City of Bacoor	604.00		4,636.00		5,240.00
3rd District					
City of Imus	2,057.00		7,644.00		9,701.00
4th District					
Dasmariñas	2,556.00		5,678.00		8,234.00
5th District					
Carmona	609.00		2,483.00		3,092.00
Silang	9,789.00		5,852.00		15,641.00
Gen. M. Alvarez	336.00		602.00		938.00
6th District					
Trece Martires City	523.00		3,394.00		3,917.00
Gen. Trias	5,158.00		6,610.00		11,768.00
Tanza	1,897.00		7,733.00		9,630.00
Amadeo	4,382.23		407.77		4,790.00
7th District					
Tagaytay City	1,802.90	2,707.00	2,105.10		6,615.00
Alfonso	5,596.67		863.33		6,460.00
Gen. Emilio Aguinaldo	3,710.00		1,393.00		5,103.00
Indang	7,755.00		1,165.00		8,920.00
Magallanes	5,571.00	1,861.00	428.00		7,860.00
Maragondon	10,266.00	4,831.73	1,451.27		16,549.00
Mendez	768.11		898.89		1,667.00
Naic	7,290.00		1,310.00		8,600.00
Ternate	273.00	3,294.90	773.10	9.00	4,350.00
TOTAL	**71,474.91**	**12,694.63**	**57,916.09**	**620.37**	**142,706.00**

Source: Provincial Planning and Development Office, City/Municipal Planning and Development Offices

Table 3.7. List of Quarry Operators, Province of Cavite: 2012

	PERMITTEE	LOCATION
1	Lamberto Lee Jr.	Sapang, Ternate
2	Attari Corporation	Sapang, Ternate
3	Angel del Rosario	Sapang, Ternate
4	Sulpicio Baria	Sapang I, Ternate
5	Ismael Pakingan	Tres Cruses, Tanza
6	Roger Laguerder	Tres Cruses, Tanza
7	Fernando Aldeguer III	Sapang, Ternate
8	Emelita Cuenca	Salawag, City of Dasmariñas
9	Narciso Peji	Pinagsanhan, Maragondon
10	LEP Trading	Lancaan, City of Dasmariñas
11	Cipriano Poblete	Pooc, Silang
12	Beam Commercial	Tres Cruses, Tanza
13	Dexter Ivan Lee	Sapang, Ternate
14	Salome Madlangbayan	Pinagsanhan, Maragondon
15	Mac Gregor Gawaran	Salawag, City of Dasmariñas
16	Jenny Diones	Pinagsanhan, Maragondon
17	Boris Jonas Aldeguer	Sapang I, Ternate
18	Leonora Q. Pakingan	Sahud Ulan, Tanza
19	Sonia Ivañez Bode	Pinagsanhan, Maragondon
20	Sabalo Enterprises	Pooc I, Silang
21	Ismael O. Pakingan, III	Punta, Tanza

Source: Provincial Government – Environment and Natural Resources Office

A regulated quarry in Ternate, Cavite.

Alienable and Disposable Lands

In the definition of National Statistics Coordination Board (NSCB), alienable and disposable lands are lands of the public domain which have been the subject of the present system of classification and declared as not needed for forest purposes.

These lands are intended for economic activities broadly classified into production and built-up areas. Production lands can be in the field of agriculture and other related industries. Built-up areas are land intended for urban development activities.

Status of Land Area Classification

The production area of the Province accounts to 50.09% of its total land area. It is followed by built-up areas that cover 40.58% of Cavite. Around 8.90% of the province is considered protection lands such as natural parks and forests and the remaining 0.43% are islands (Table 3.6).

Maragondon and Silang are relatively agricultural municipalities with 10,266 and 9,789 hectares of production land, respectively. Tanza, City of Imus and Gen. Trias are the municipalities with most area intended for urbanization. Meanwhile, despite relatively small land area, the cities of Bacoor and Trece Martires are dominated with built-up area with only 604 and 523 hectares considered as production land, respectively (Table 3.6).

Soil Characteristics

The identification of the soil type in a particular area is a very important activity in profiling. This is very useful in recommending the best land-use for that area. Moreover, if intended for agriculture, knowing the soil type will also aid in identifying the most suitable crops to be planted in the area. This will contribute to the achievement of optimized land productivity.

The soil surveys conducted by the Bureau of Soils and Water Management (BSWM) revealed that Cavite is composed of several soil types. The lowland area of Cavite is generally composed of Guadalupe clay and clay loam. This soil type is characterized as coarse and granular when dry but sticky and plastic when wet. Its substratum is solid volcanic tuff. These types of soils are suited to lowland rice and corn while those in the upland are suited for orchard and pasture. Guadalupe clay adobes are abundant in the southern part of cities of Bacoor and Imus bordering the city of Dasmariñas. The soil is hard and compact and difficult to cultivate that makes it generally unsuitable for diverse cropping. It is very sticky when wet and granular when dry. Forage grass is advised for this type of soil. Hydrosol and Obando sand are found along Bacoor Bay. The shoreline of Rosario, Tanza, Naic and Ternate are lined with Guadalupe sand.

The central area principally consists of Magallanes loam with streaks of Magallanes clay loam of sandy texture. This is recommended for diversified farming such as the cultivation of upland rice, corn, sugarcane, vegetables, coconut, coffee, mangoes and other fruit trees. The steep phase should be forested or planted to rootcrops. The eastern side of Cavite is consists of Carmona clay loam with streaks of Carmona clay loam steep phase and Carmona sandy clay loam. This type of soil is granular with tuffaceaous material and concretions. It is hard and compact when dry, sticky and plastic when wet. This type of soil is planted to rice with irrigation or sugarcane without irrigation. Fruit trees such as mango, avocado and citrus are also grown in this type of soil. Guingua fine sandy loam is found along the lower part of Malabon and Alang-ilang River at Noveleta.

The type of soils that dominate the upland areas are Tagaytay loam and Tagaytay sandy loam with mountain soil undifferentiated found on the south-eastern side bordering Laguna province. Also on the southern tip are Magallanes clay and Mountain soil undifferentiated with interlacing of Magallanes clay loam steep phase. The Tagaytay loam contains fine sandy materials, moderately friable, and easy to work on when moist. In an undisturbed condition, it bakes and becomes hard when dry. About one-half of this soil type is devoted to upland rice and upland crops. On the other hand, Tagaytay sandy loam is friable and granular with considerable amount of volcanic sand and underlain by adobe clay. Mountain soil undifferentiated is forested with bamboos found in the sea coast. Cavite also has the Patungan sand characterized by pale gray to almost white sand with substratum of marine conglomerates which are found at Sta. Mercedes in Maragondon and in some coastlines of Ternate.

Forestry

The Mounts Palay-Palay and Mataas Na Gulod Protected Landscape

Cavite is very fortunate to have an area which is considered to be biologically rich. In 1976, by virtue of Presidential Proclamation No. 1594, the Mounts Palay-Palay and Mataas na Gulod were declared to be national parks. The declaration aims to preserve the natural biodiversity of the area as part of the advocacy to preserve the country's natural heritage. The national parks were later named as the Mounts Palay-Palay and Mataas na Gulod Protected Landscape.

The entire landscape is composed of 3,973.13 hectares. The preservation of its natural biodiversity is a strategic move considering the rapid urbanization

happening in the province of Cavite and the nearby Metro Manila. Known to be a good source of water, it is of utmost importance to preserve and rehabilitate the damaged portions of the national park.

The national park is approximately located within the geographic coordinates of 14º12' to 14º17' north latitude and 120º38' to 120º42' east longitude. The park covers four (4) barangays (Sapang, Pinagsanhan, Patungan and Papaya) and seven (7) sitios (Malauyas, Caynipa, Caytako, Cacabay, Magabe, Murangdalig and Hamilo). Different portions of the park can be found in three municipalities (Ternate, Maragondon and Nasugbu) under two provinces (Cavite and Batangas).

The Mounts Palay-Palay and Mataas na Gulod Protected Landscape Management Zones

The Park is divided into 10 management zones that ensure a balanced land-use for the park. These are as follows:

1. Strict Protection Zone – 250 hectares

This special zone has high biodiversity value. The area is strictly protected with no man-made interventions or changes are allowed except for scientific studies and/or ceremonial or religious use by indigenous communities. Getting any flora or fauna specie from the area is strictly prohibited. On the other hand, introduction of foreign flora or fauna is likewise not allowed. The strict protection zone is concentrated around the Mts. Palaypalay/Mt. Pico de Loro and abutting the Calumpang Point Naval Reservation.

2. Sustainable Use Zone – 1,995 hectares

This zone covers the largest area of the park. The area can be utilized for sustainable livelihood of the surrounding communities such as gathering of medicinal leaves and roots and the likes. Only natural propagation is allowed in this area and only species that are already present can be cultivated. Furthermore, harvesting will be controlled to maintain natural equilibrium. A portion of the stretch of the Mamba/Cacabay River can be found in this zone.

3. Restoration Zone – 280 hectares

This area was considered a degraded zone which needs to be restored to regain its rich natural habitat. This area will be subjected to activities, fire control, cogon suppression and reforestation to name some. Reforestation will be limited to native species of trees. Once rejuvenated, the area will change its management zone classification. A portion of the stretch of the Palicpican River is located in this zone.

4. Habitat Management Zone – 270 hectares

This is an area with significant habitat and specie value. This zone is subjected to management practices so as to maintain specific condition or habitat for rare, threatened and endangered species. Human habitation and sustainable use maybe allowed if they play a habitat management role. A portion of the stretch of the Palicpican River is located in this zone.

5. Multiple Use Zones - 268 hectares

This area can be utilized for controlled settlement, traditional/sustainable land use, agriculture and income generating activities but should fall within the prescribed activities in the management plan. A portion of the Mamba/Cacabay River is part of this zone.

6. Buffer Zone – 250 hectares

Under the RA 7568, buffer zones are defined as "identified areas outside the boundaries of and immediately adjacent to designated protected areas that need special development control in order to avoid or minimize harm to the protected area." With respect to the Mounts Palay-Palay and MataasnaGulod Protected Landscape, its buffer zone includes the Calumpang Point Naval Reservation, Palicpican Bay, the Caylabne and Puerto Azul Resorts, the rest of Barangay Sapang A of Ternate, Cavite, the rest of Barangays Pinagsanhan A, Pinagsanhan B and Patungan of Maragondon and Barangay Payapa of Nasugbu, Batangas.

7. Recreational Zones – 185 hectares

This area is considered to be of high recreational, educational or environmental awareness value. If the regulating bodies will allow, in consideration of their management plan, activities like eco-tourism, recreational, conservation education or public awareness activities can be done. In this area, facilities like visitor's center, nature trails and food centers can be established. The revenues generated from it can be used to finance programs in benefit of the Park.

8. Alienable and Disposable Zone/Puerto Azul Zone – 502 hectares

This zone can be used for commercial activities as in the case of Puerto Azul Zone.

9. Marine and Coastal Zone

10. Other management zone as maybe used in the management plan and approved by the Secretary

Location of Protected Areas

A total of seven (7) sitios are considered protected areas in Cavite. Likewise, there are portions of the protected areas in the province that extend up to its nearby province such as Batangas (Table 3.8).

Table 3.8. Location of Protected Areas, Province of Cavite: 2012

Names	Locations
Mts. Palay-palay/ Mataas na Gulod	Ternate, Maragondon, Portion of Nasugbu, Batangas
Sitio Malauyas	Ternate, Cavite
Sitios Caynipa, Caytako, Cacabay, Magabe, Mambe, Murandalig	Brgy. Pinagsanhan B, Maragondon, Cavite
Sitio Hamilo	Brgy. Payapa, Nasugbu, Batangas

Source: Department of Environment and Natural Resources

Protected Forest Area

The protected areas in Cavite could either be vegetative forest or non-forest. The land areas it occupies are as follows:

Table 3.9. Protected Forest Area as a Percentage of Total Forest Area, Province of Cavite: 2012

Predominantly Timberland	Cover Estimated	Land Area in Hectares
Vegetative Forest	62.50%	2,483.21
Non-Forest	37.50%	1,489.92
TOTAL FOREST AREA		**3,973.13**

Source: Department of Environment and Natural Resources

Reforestation Projects

Reforestation is the natural or intentional restocking of existing forests and woodlands that have been depleted, usually through deforestation. Reforestation can be used to improve the quality of human life by soaking up pollution and dust from the air, rebuild natural habitats and ecosystems, mitigate global warming since forests facilitate biosequestration of atmospheric carbon dioxide, and harvest for resources, particularly timber (Wikipedia).

Continuous restoration and preservation of natural resources plays important role in balancing the environment. With this advocacy, the Department of Environment and Natural Resources in coordination with the Provincial Government-Environment and Natural Resources Office are conducting various reforestation projects to sustain the richness of the environment in the province.

For the year 2012, a total of 5,775 seedlings of assorted variety were planted. According to the monitoring, a total of 3,725 trees were able to survive with a survival rate of 64.5%. The reforestation took place in the areas of Ternate, Naic, Magallanes, Indang, Alfonso and Amadeo – all upland municipalities of Cavite. The reforestation endeavors were participated by various public and private entities. In terms of total land area covered, a total of 77,000 square meters were covered and in terms of roadside planting, a stretch of 13,680 linear meters were planted (Table 3.10).

On the other hand, the number of hectares of reforested land by the Provincial Environment and Natural Resources Office (PENRO) totaled to 52 hectares. The specie planted was rattan. The project covered the areas under the Protected Area Community Based Resource Management Agreement (PACBRMA) and National Greening Program (Table 3.11).

Table 3.10. Cavite Arbor Day Tree Planting Program Report, 2012

	2012
Total Tree Seedlings Planted	5,775
Total Trees Survived	3,725
Survival Rate	64.5%
Species Planted	Acacia, Caballero, Narra, Mahogany, Puso-Puso, April Shower, Ilang-ilang, Anonas, Atis, Chesa, Casuy, Galo, Guava, Guyabano, Kalamansi, Langka, Suha, Longgan, Macopa, Mango, Rambutan, Santol, Sampaloc
Host Municipalities	Ternate, Naic, Magallanes, Indang, Alfonso, Amadeo
Participating Agencies, Organization and Volunteers	LGU Employees, PGENRO, PENRO, DAR, Military Personnel, Students and Teachers, Rosario Rotary, Rosario Petron Depot Tourism Cavite, Religious Sector, Brgy. Councilors
Total Area Covered	77,000 square meters 13,680 linear meters

Source: Provincial Government – Environment and Natural Resources Office

Carmona Municipal Government Arbor Day Celebration

Table 3.11. Reforestation Projects, Province of Cavite: 1981 to 2012

Year Established	Area(in hectares)	Species Planted	Location
1981-2001	697.00	assorted species	Mts. Palay-palay/Mataas na Gulod reforestation Project located at Maragondon & Ternate & Magallanes, Cavite
2002	11	assorted species	Mts. Palay-palay/Mataas na Gulod reforestation Project located at Maragondon & Ternate
2003	-	-	-
2004	10	mahogany & narra	Mts. Palay-palay/Mataas na Gulod reforestation Project located at Maragondon & Ternate
2005	12	mahogany	-do-
2006	-	-	-
2007	24	acacia, narra, camachile mahogany, tuba-tuba	San Agustin, Magallanes, Cavite
2008	12	mahogany, narra, acacia	Mts. Palay-palay/Mataas na Gulod reforestation Project located at Sapang,Ternate
	32	mahogany, narra, acacia & akleng parang	-do- (under soil conservation & watershed management)
2009	52	Mahogany, narra,mango, jackfruit, santol, rambutan, kaimito,	Pinagsanhan, Maragondon and Sapang, Ternate
2010	no	plantation	establishment
2011	312.318	Mahogany, alibangbang, Narra, banaba, fire tree, anahaw, golden shower, Molave, kupang, eucalyptus, balete, kaong	Urban watershed, PACBRMA and CBFM areas
2012	52	Rattan plantation	PACBRMA/NGP Project
TOTAL	1162.318		

Source: Provincial Environment and Natural Resources Office

Mangrove Areas

Mangroves are various types of trees up to medium height and shrubs that grow in saline coastal sediment habitats. The ecological balance does not end in the protection of the land but of the water resources as well, Part of this is the maintenance of mangrove areas that supports the water ecosystem. Despite that coastal settlements are not encouraged, mangroves also serve as protection among inhabitants in the coastlines.

The Provincial Environment and Natural Resources Office of Cavite is actively promoting the protection and rehabilitation of mangrove areas in the province and even creating new ones. For the year 2011, the PENRO conducted an inventory of mangrove areas in Cavite as follows:

Table 3.12. Mangrove Areas, Province of Cavite: 2012

Municipality/City	Area(hectares)
Bacoor	0.26
Kawit	13.06
Cavite City	0.99
Noveleta	4.12
Tanza	6.50
Rosario	3.00
Naic	0.50
Ternate	2.12
Maragondon	2.10
TOTAL	32.65

Source: Provincial Environment and Natural Resources Office (PENRO), Trece Martires City

A mangrove planting project in Noveleta, Cavite

Non-Metallic Resources

The greater parts of Cavite are composed of volcanic materials, tuff, cinders, basalt, breccias, agglomerate and interbeddings of shales, and sandstones. The dormant and active volcanoes (Taal) are within these volcanic areas and have been the sources of volcanic materials which form the Tagaytay Cuesta. The drainage systems are deeply entrenched in the tuffs, eroding thin interbedded sandstones and conglomerate rocks which are the sources of little reserves of sand and gravel in the larger stream. Adobe stone quarries also flourish in the tuff areas.

Cavite coastal areas have marl and conglomerate sedimentary rocks and some igneous rocks which are prominent in the high, mountainous regions of western part of the province. Black sands are found in Kawit while Noveleta has its own salt products. Magallanes has gravel deposits while reserves of sand and gravel materials are found in Alfonso, Carmona, Gen. Aguinaldo, Naic, Ternate, Maragondon and Silang (Table 3.13).

Table 3.13. Mineral Deposits, Province of Cavite

City/Municipality	Mineral Deposits	Location
Alfonso	Gravel, Sand	
Carmona	Gravel, Sand, Clay	Mabuhay, Ulong Tubig
Gen. Aguinaldo	Gravel, Sand	Batas-Dao, Lumipa
	Adobe, Boulders	Batas-Dao
		Kaymisas & Lumipa
Kawit	Black Sand	San Sebastian
Ternate	Graveland Sand	Bucana, San Jose, San Juan,
	Boulders	Poblacion
	Banda-Banda	Sapang
Magallanes	Gravel Deposit	Ramirez, Urdaneta
Maragondon	Manganese, Iron	Tulay, Mabato
	Gravel, Sand	Caingin
Naic	Sand	
Noveleta	Salt	San Rafael, Tibagan, Malaking Ilog, Matindig
Silang	Sand	

Source: Provincial Government-Environment and Natural Resources Office (PG-ENRO) Trece Martires City

Watershed Areas Supporting National Irrigation System (PENRO Report)

Cavite has no declared watershed. However, the Department of Environment and Natural Resources Office conducts watershed characterization, vulnerability assessment and management plan for Ilang-Ilang River Watershed and Maragondon River Watershed. These two were identified by the National Irrigation System Supporting Watershed Program.

The National Irrigation Administration (NIA) was created under Presidential Decree No. 552 and Cavite Friar Lands Irrigation System (CFLIS) became one of the National Irrigation Systems being managed by NIA. Municipalities served by CFLIS with firmed-up service area (FUSA) of 8,489.59 hectares which includes the municipalities of Ternate, Maragondon, Naic, Tanza, Gen. Trias, Imus, Dasmariñas and Bacoor.

The designed service area of the system is 15,000 hectares with rice as the main crop planted. Records from NIA indicate that the average farm size of the area is 2.4 hectares with 4,473 land owners and farmer beneficiaries of 6,543.

Major irrigation facilities in the system consist of 18 diversion dams, 72, minor dams, 2 reservoirs and conveyance canals including appurtenant structures. The major dams divert water from 18 rivers and one (1) creek.

As mentioned earlier, for Calendar Year 2009, PENRO had undertaken the characterization of Maragondon River Watershed and the preparation of Integrated Watershed Management Plan for the same watershed area as well as the introduction of soil and water conservation measures by rip rapping some highly erodible and degraded areas in Brgy Biluso, Silang.

For CY 2010, through the program, five (5) hectares vegetative measure along the river easement at Lumampong Balagbag, Indang, Cavite was established. For CY 2011, six (6) hectares stream bank rehabilitation was implemented in Guyam Malaki, Indang, Cavite. In the year 2012, a 232 hectares stream-bank protection project under the National Greening Program was planted with bamboo, kaong and indigenous species in the Municipalities of Alfonso and Gen. Aguinaldo, portion of which falls within the Maragondon River Watershed. Stream bank protection projects also materialized in selected barangays of the Municipalities of Silang, Dasmarinas City and Maragondon, part of the area traverses the Ylang-ylang River Watershed.

Table 3.14. Cavite Friar Lands Irrigation System's Source of Water Province of Cavite: 2012

SOURCE OF WATER	DIVERSION CAPACITY (Lps)
1. Balayungan River	1,004.00
2. Culong-Culong River	583.00
3. Balsahan River	1,241.00
4. Kay-Alamang River	950.00
5. Sahing River	576.00
6. Timalan River	600.00
7. Puting Tubig River	890.00
8. Balabag River	710.00
9. Quintana River	2,010.00
10. Panaysayan River	830.00
11. Polonan River	1,080.00
12. Maragondon River	1,100.00
13. Matang Ulang River	550.00
14. Rio Grande River	1,000.00
15. Alang-Alang River	1,041.00
16. Malinta River	905.00
17. Imus River	800.00
18. Baluctot River	750.00
19. Malaking Ilog River	605.00

Source: National Irrigation Administration, Naic. Cavite

Prinza Dam at gen. Trias Cavite. Photo by Steven Que

Maragondon River

Table 3.15. Municipalities Served by Cavite Friar Lands Irrigation System, Province of Cavite: 2012

Location	Area
Ternate	39.8500
Maragondon	574.9552
Naic	1,994.8142
Tanza	1,747.7540
Gen. Trias	2,446.7316
Imus	1,133.1894
Dasmariñas	468.4436
Bacoor	83.8471
Total	**8,489.5900**

Source: National Irrigation Administration, Naic, PENRO

Table 3.16. Established Watershed Plantation, Province of Cavite: 2012

Year Established	Area (has.)	Species Planted	Location/Project Site
1996	1.0000		
1997	1.0000		
1998	.5000		
1999	13.0000		
2000	24.0000	Mahogany & dapdap	Indang, Cavite
2001	0.9000	Mahogany	Pinagsanhan, Maragondon, Cavite
2002	2.5000	Mahogany & dapdap	Alfonso, Cavite
2003	6.0000	Mahogany & dapdap	Mahabang Kahoy, Indang
2004	no	Watershed plantation	Vegetative measures established
2005	no	Watershed plantation	Vegetative measures established
2006	no	Watershed plantation	Vegetative measures established
2007	no	Watershed plantation	Vegetative measures established
2008	32.0000	Mahogany	Sapang, Ternate
2009	no	Watershed plantation	Vegetative measures established
2010	5.0000	Narra, mahogany & dapdap	Lumampong Balagbag, Indang
2012	232.0000 170.0000	Kaong, bamboo, malaruhat, bignai, narra, kalumpit Narra, molave, batino, dao	Alfonso & Gen. Aguinaldo (NGP-Streambank Protection Project) Puting Kahoy, Silang, Sampaloc 1 & 2, San Agustin 1 & 2, Dasmarinas City & Pantihan 1, 2, 3 & 4, Maragondon, Cavite
TOTAL	**493.9000**		

Source: National Irrigation Administration, Naic, PENRO

Established Forest Parks

Forest parks are being established in different parts of the province in order to promote environmental protection even in the urban areas. These parks also serve as a venue for recreational activities like picnicking. The Province of Cavite had established three (3) mini-forest parks in Trece Martires City, Silang and Tanza.

Table 3.17. Established Forest/Tree Park, Province of Cavite: 2012

Location	Date Established	Area (in Hectares)
Brgy. Luciano Trece Martires City	June 5, 1996	1.4
PNPA, Camp Castañeda, Lumil, Silang, Cavite	June 6, 1997	1.5
Camp Riego De Dios, Paradahan, Tanza, Cavite	June 11, 1998	1.0
TOTAL		3.9