Changes in land use of irrigated paddies: A study of land conversions in Plaridel, Bulacan*

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Introduction

The rate of population increase in the urban cities has become very alarming. The rural-urban shift fueled by the concentration of opportunities in the cities is perhaps one of the country's most interesting phenomena. As the country strove to industrialize, people in the countryside flocked to the cities and further aggravated the congestion of urban centers, pushing middle and upper income groups to the suburbs. This was facilitated by large-scale highway and transportation development. In the process, however, vast tracts of agricultural lands became the site of sprawling settlement areas.

Land use strategies now shifted from a rural to a relatively intensive urban orientation. In the process, neighboring and intermingled tracts are left unimproved or fully idle. The ribbon development along the highways creates an urban sprawl and cases of premature spot development which are often substandard due to lack of adequate services (Sah, 1971).

This unplanned urbanization has led to an unwarranted encroachment on agricultural lands. This kind of land transformation differs from forest-to-farmland conversion. In the latter case, the reproductive capability of lands remains. But urbanization causes lands to be reshaped physically, and covered

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with asphalt, cement, buildings, and other impervious surfaces which greatly interfere with the processes of energy transfer and soil-water cycles.

Areas covered by the Agrarian Reform program were not exempt from urban-oriented encroachment. The Central Luzon and the Southern Tagalog regions, for example, were priority areas for land distribution to the actual tillers of the soil. Yet these are the same areas that were identified and are being prepared and developed for industrialization purposes.

The perception that these outer limits of the capital region are sparsely populated agricultural lands is not true anymore. In fact, one major problem that these regions face is haphazard urban expansion and development. But, these agricultural areas may be better preserved for intensive agricultural production or environmental purposes (Sein, 1976).

Land conversion is defined by the Department of Agrarian Reform (DAR) as "the act of authorizing the change of the current use of a piece of land into some other use". This process of shifting the use of land resources must be understood within the sphere of the following related concepts: land use classification, land use plan, zoning, and zoning ordinances.

Land conversion is a new phenomenon that is taking place at a very fast rate. If not properly studied, planned, controlled and monitored, land conversion may result in social, political, economic and ecological conditions which will put greater pressure on, and marginalize even more the country's farming population.

This paper looks at some of the problems of land conversion. It aims to:

a) determine the spatial extent by which land conversion has taken place in Plaridel, Bulacan, in the past twenty years;

b) comment on the land conversion process and the moves of the people responsible for monitoring this;

c) document some settlement procedures that have taken place among landowners, tenants and other parties involved in the process like the developers, homelot buyers, politicians, government officials, and others, during the process of land conversion;

d) trace the conditions of the former landowners, tenants, and agricultural workers after conversion has taken place;

e) document and discuss the impact of a land conversion decision on the following:

1. irrigated agricultural lands and agricultural food production;
2. natural environment and living spaces of the affected households;
3. socioeconomic conditions of the affected members of the community; and
4. land reform implementation;

f) consider some suggestions that may help the process of realizing a life-enhancing land use conversion.

The study provides additional insights on the following questions specific to Plaridel:

How many hectares of irrigated lands were converted (official and unofficial) in Plaridel, Bulacan over a given time period? What are the effects of these conversions, legitimate or otherwise, on the area's agricultural resources, ecological viability, and inhabitants' lives?

Hopefully this paper can come up with relevant policy inputs on land conversion so that the powers of government functionaries to implement and enforce policies will be recognized and made more effective.

Research methods

Several research methods were used to attain the objectives of the study.

The study came up with four lands use maps of Plaridel. Each map represents land utilization patterns of Plaridel, Bulacan at four different periods: 1967, 1981, 1987, and 1991.

The 1967 land use map of Plaridel was based upon the interpretation of an aerial photo of the town of Plaridel taken in that year. Information was gathered using a binocular stereoscope. This information was plotted in freehand to come up with the map. The J-2 Office and Mapping Center of the Philippine Army in Camp Aguinaldo provided the assistance necessary for this activity.

The 1981 land use map was based on existing maps of Malolos and other municipalities of Bulacan.

The 1987 land use map was plotted after interpreting information from a map published by the Philippine Army and the US Defense Mapping Agency, which was an updated version of the 1981 map of Plaridel.

The 1991 land use map was plotted based on a ground survey of the existing land uses in Plaridel done from February to May 1991. Field observation and groundmapping, using the pacing technique were instituted to come up with a land use map of Plaridel for 1991. Although it lacks most of the information found in the first three maps mentioned earlier, the 1991 land use map provides very good information on where land developments have taken place in Plaridel, Bulacan, since 1987.

After they were plotted on the same scale, the maps were compared with each other. The different features, e.g. areas which were irrigated, vegetated, or developed, were analysed noting the changes in land use from 1967 to 1991.

A measurement technique called the dot grid matrix was used for area determination and to account for the increase in the areal coverage of different land uses in the area. The general formula for area determination, which is length X width, was adopted. The scale of the maps that were measured was 1:15,000.

The study also made use of the interview technique. The researcher interviewed the different actors involved in the conversion process regarding their views about land conversion. A questionnaire with structured and open ended questions was utilized.

In addition, secondary data was gathered from different government agencies and nongovernment sources.

Plaridel, Bulacan: A town in transition

Plaridel, a 30-minute drive from Manila, is located at the center of the province of Bulacan. It is accessible through the North Super Highway, the Manila-Cagayan Road, and the Malolos-Norzagaray Road or the Gov. Padilla Provincial Road (Figure 1). It is bounded by Guiguinto on the south; Balagtas on the southeast; Pandi on the east; Bustos on the northeast; Angat River and the towns of Pulilan and Baliwag on the north; Calumpit on the northwest; and, Malolos on the west.

The history of Plaridel dates back to the early colonization of the Spaniards in 1605, as stated in the annals of the Augustinian friars and in the documents found in the National Archives (Provincial Records of Bulacan). It was originally called *Quingua*, but was renamed *Plaridel* in 1936, in memory of Marcelo del Pilar, a noted reformist and patriot of Bulacan.

During the Filipino-American war, the Americans under the command of Colonel John Statenburg fired the first shot in Quingua on April 23, 1899, but he was killed by the Filipino troops under the command of Gregorio del Pilar. This forced the American troops to leave the area the following day.

Plaridel is also historically remembered as the pilot municipality for the implementation of the land reform program under the administration of President Macapagal in 1963.

Plaridel has a total land area of 4,250 hectares, 2,910 hectares of which are fully irrigated agricultural lands. It has nineteen barangays, all of which have good road networks.

The town has a flat topography with an average elevation of ten feet above sea level. The lands are perfectly suited for agricultural cultivation. Its irrigated lands produce 204,004.9 cavans during the wet cropping season. They have two rice croppings annually, which can easily produce half a million cavans of rice in a year. The rainy season starts in the latter part of April or early part of May and ends in November or December.

Four main soil types make up the land. Fine sandy loam, found in the river bank of Angat River, characterizes close to forty percent (38.8%) of Plaridel's lands; Prensa silty loam, about twelve percent (12.15%); Quingua silty loam, about fifty percent (48.67%); and the Bigaa clay loam, about 16 percent. The soil is suitable for fruits and vegetables aside from rice.

Plaridel's population was 52,954 as of May 1, 1990 (NCSO, 1990). Plaridel is classified as a community progressing at a relatively fast rate as evidenced by the presence of one of the highest earning marketplaces in the province and the operation of five banking institutions.

Unknown to many, Plaridel's fertile lands are rapidly being converted into subdivision sites and other related projects. The land conversion taking place in Plaridel may not be as celebrated as that in Langkaan, Dasmariñas, Cavite, but is similar to that taking place in the CALABARZON areas, as well as other Central Luzon municipalities. The transformation of agricultural lands to industrial or real estate sites in Plaridel is done quietly, but is no less real or permanent.

Table 1: No. of Population and Household per Barangay of Plaridel, Bulacan

Barangay	Number of Population	Number of Households
Agnaya	1,338	243
Bagong Silang	1,024	205
Banga I	3,928	773
Banga II	5,579	1,071
Bintog	2,283	430
Bulihan	2,929	553
Culianin	2,072	433
Dampol	1,679	311
Lagundi	1,923	346
Lalangan	940	167
Lumang Bayan	2,966	548
Parulan	4,202	799
Poblacion	3,389	624
Rueda	1,089	191
San Jose	2,249	430
Sipat	2,853	519
Sta. Ines	1,321	232
Sto. Niño	5,297	982
Tabang	5,843	1,098
Total	52,954	9,955

Source: NCSO, 1990

Land use changes in Plaridel from 1967 to 1991

In 1967, the developed areas in Plaridel, which consisted of residential, institutional, and commercial sites, occupied approximately 63.22 hectares. Roads plotted in the map measured 32,200 meters long, occupying an area of about 28.98 hectares. The concentration of houses where most of the population lived, was found in the poblacion and along the Manila-Cagayan road and the Gov. Padilla road that connects Plaridel to Malolos, the provincial capital. A 3,400-meter long railroad track was found in the eastern portion of the municipality traversing the barangays of Bagong Silang, Banga and Parulan.

There were five orchards found in the municipality, occupying an area of approximately 24.78 hectares. The length of the tree lines measured 62,450 meters. This was twice the length of the road systems of Plaridel in 1967. Assuming that there was a tree planted in four-meter gaps, the number of trees found in the municipality in 1967 would be approximately 15,612. Mango,

kaimito (star apple), and other fruit trees were abundant in the area in the late 1960s (Figure 2).

The irrigation facilities in Plaridel were very extensive. Irrigation canals measured 36,975 meters in length and serviced most of the agricultural lands of Plaridel. The 13,400-meter long Angat river and ten creeks provided water to other areas not reached by the irrigation facilities. Water is available almost anywhere in the municipality.

According to the 1981 land use map (Figure 3), changes were made in the municipality's irrigation facilities. Irrigation canals with a total length of 3,100 meters were installed in the barangay of San Jose, while the 6,450-meter long irrigation canals found in barangays Bulihan, Sta. Ines and Lalangan in 1967 were no longer found in the 1981 map. The creeks in Barangays Rueda and Lagundi dried up, reducing the length of the creeks traversing the two barangays by 1,750 meters. A three-meter irrigation road was built in the area transforming approximately 11.09 hectares of agricultural lands to barangay service roads.

In the 1981 map, the presence of the North Expressway, which is about 4,100 meters, is very noticeable. It divided the agricultural lands of Sto. Niño, Sipat and Dampol into two parts. Additional roads totalled 9,075 meters, transforming 9.07 hectares of land into either asphalted or cemented streets. A total of 2,125 meters of municipal roads was built in the poblacion and/or town proper area, while 2,850 meters were constructed in Tabang. Tabang is a barangay along the Manila-Cagayan highway which underwent considerable physical changes in terms of the number of houses built.

All in all, a total of 116.2 hectares was added to the developed area of Plaridel, Bulacan. Adding this to the total built-up area in 1967, lands for residential, commercial, and institutional uses totalled 179.42 hectares.

Interestingly, as indicated in the maps, the area planted to orchards decreased to 18.76 hectares, as only four orchards were left in the town by 1981. Some of the tree lines found in the 1967 map disappeared, and the spread and length of scattered tree lines shortened by almost fifty percent (50%) also. Only 15,175 meters of tree lines indicating 3,793 trees were left by 1981. There was, however, an indication that the former tree sites were converted to croplands.

In 1987, the areas designated in the map as built-up areas was approximated to be 268.98 hectares (Figure 4). A total of 84.56 hectares was added to the existing 179.42 hectares indicated in 1981. The length of the roads added according to the map of 1987 totalled 7,650 meters. This comprised an additional 7.65 hectares of lands converted into asphalted and/or cemented roads/pavements. Up to this point, the roads and the built-up areas approximately covered 361.27 hectares of the total land area of Plaridel.

The irrigation canals lengthened by 3,600 meters in the barangays of Lalangan, Sta. Ines, and Bulihan, while a total of 750 meters of irrigation canals was closed in barangays Ines and Lalangan. The creek in Rueda shortened by 425 meters. The areas covered by the orchards decreased to 14.56 hectares, while the length of the scattered trees decreased to 12,400 meters. The number of trees decreased to about 3,100.

The 1987 map showed ten areas in Plaridel subjected to inundation. About 210.56 hectares of lands were periodically inundated by floodwaters in 1987 and onwards. Interestingly, the flooded sites were formerly the areas where orchards and scattered trees were found twenty years earlier, i.e., 1967.

In 1991, the built-up areas of Plaridel expanded to 329.28 hectares. The increase has been attributed to more residential projects in the area (Figure 5).

This means that an average of ten percent of Plaridel's irrigated agricultural lands is converted to residential, commercial or institutional areas per year. This observation and the rate of land use changes in the past five years based on other records of conversion necessitate considerable attention and preventive action.

Spill over effects of overcentralized development

The magnitude of land use change in the municipality of Plaridel, which is among the municipalities surrounding Metro Manila, is to be expected.

Central Luzon or Region 3 is identified as one of the "two highest urbanized areas in the country" (UPIP-DAR, 1974). Several growth centers were identified in the six provinces comprising the area. Bulacan was among those singled out in 1974 as an area where "further urban expansion will take place in the next 10 to 15 years" because of the following factors: a large population, high economic growth rate, and strategic location -i.e., it is along a main transport system (UPIP-DAR, 1974). Almost twenty years later, Bulacan has indeed become a growth center in the northern part of the metropolis.

Plaridel is now classified as a "secondary sub-regional center". The transportation arteries in the municipality have really affected the growth and change in the pattern of land use in the municipality, especially in relation to the development taking place in Metropolitan Manila. Plaridel offers affordable and accessible homesites for people working in the metropolis.

As can be observed, the irrigated ricelands in Plaridel is becoming the site of many subdivisions for the growing urban population. Table 2 will show how much conversion has taken place in the area set aside solely for the purpose of developing residential subdivisions.

Thus, the subdivisions in Plaridel offered an additional 4,178 residential lots that could provide homesites to four thousand families, who may or may not be from Plaridel. At the same time, however, 939 members of the farming population were displaced and had to move to other places to seek employment when the subdivisions were built.

Table 2: List of Existing Subdivisions in Plaridel, Bulacan

Location	Owner/Developer	Area (sq. m.)	No. of lots (sq. m.)
1. Castro Village Subd., Banga II	Antonio Castro	33,467	110
2. Sta. Monica Subd. Sto. Niño	Eugenio Trinidad	200,000	535
3. Isabel Village Subd., Tabang	T. Cabantog & R. Pagtalunan	84,517	236
4. Mariano Subd. Agnaya	Severino Mariano	60,000	188
5. Plaridel Farm Banga I	Romen Sayo	1,700	83
6. Maria Ramona Subd., Tabang	Fortunato Peña Jr.	43,816	97
7. Villa Gloria Subd. Agnaya	Felipe S. de Jesus	40,148	147
8. Plaridel View Park Banga II	Cecilio Vivas	64,320	2,130
9. Maria Lourdes Subd., Tabang	Lourdes Enriques Peña	184,723	437
10. St. James Subd. Agnaya	Quedding Realty Inc.	81,509	215
		794,200	4,178

The following is a summary of other conversion activities that are taking place in the municipality.

Table 3. Land Conversions in Plaridel, Bulacan from June 17, 1988 to April 17, 1991

Owner/Developer	Barangay	Area (ha)	Land Use Previous	Present	Status of Application w/	w/o
Madrilejo	Tabang	7.0398	riceland	subd.	/	
Robles	Tabang	6.8748	riceland	subd.		/
Peña	Tabang	10.1380	riceland	subd.		/
Mariano	Agnaya	2.9880	riceland	subd.	/	
Mariano	Agnaya	11.3186	riceland	subd.		/
Baetiong	Sto.Niño	8.3186	riceland	subd.		/
Solano	Sto.Niño	8.7060	riceland	subd.		/
Constantino	Banga	.7058	riceland	subd.		/
Castro	Banga	.8806	riceland	subd.		/
Enriquez	Tabang	1.2600	riceland	subd.		/
Puatu	Bulihan	4.0000	riceland	subd.		/
Pedro	Agnaya	.2279	riceland	subd.	/	
Garcia	Agnaya	.2000	riceland	subd.		/
Lepana	Sta.Ines	1.2000	riceland	subd.	/	
Vistan	Tabang	1.0000	riceland	comm.		/
Vistan	Tabang	.7000	riceland	comm.		/
Tantoco	Agnaya	7.3000	riceland	subd.		/
Winner RED, Corporation	Sto.Niño/ Lalangan	113.0000	riceland	----	/	
Rocka Village	Tabang	4.8409	riceland	subd.	/	
Lepana	Lalangan	10.0000	riceland	----	/	
Total		**200.6990**			**39.29**	**61.40**

Source: PARO Report on Conversion, Baliuag, Bulacan, 1991.

N.B.

'subd.' means subdivision purposes; 'comm.' indicates commercial use for the land; 'w/' indicates the owner/developer applied for a conversion permit; and 'w/o' indicates conversion took place without the needed clearance from DAR.

Of the twenty conversion cases presented above, only seven developers or 35 percent of the total have applied for land conversion permit. The other 65 percent proceeded with the conversion of their agricultural lands without securing clearance from the DAR.

It can also be inferred from the table that the lands converted to residential sites were agricultural lands. If one looks at the maps where these croplands are found, one will see an extensive irrigation network servicing the area. Thus, most, if not all, of these lands are the irrigated parts of Plaridel.

Farms were converted to residential areas because the owners wanted to earn more profits; they were reluctant to see hard-earned family property go to tenants; and they wanted to contribute to government efforts to build affordable housing projects.

Implications for agriculture

As indicated earlier in this paper, conversion of farmlands to built-up areas is often an irreversible process. This type of land development can mean a permanent loss of the soil's capacity for agricultural production. What is at stake here is not the quantity of agricultural lands that will be lost to other uses, but the loss of a limited number of prime quality croplands. The hectarage of lands being converted is not just a minute fraction of the lands of Plaridel, but is among the most productive that the country has.

It brings to light a problem that will arise from the loss of fertile agricultural lands. Tillers in search of land will encroach upon marginally productive upland areas. "The overall effect is a misappropriation of land resources. Fertile agricultural lands are lost to activities not requiring fertile soil, marginally productive upland areas are cultivated, and forest areas continue to decrease in size (EMB-DENR)". The process of environmental degradation ultimately affects the productivity of the land and its capacity for food production.

Most of the farmers opposed to conversion said that converting agricultural lands into other purposes will be counterproductive to the program of the government to address the shortage of food, particularly rice. This is further aggravated by the fact that the lahar-ravaged lands would remain uncultivated for some time.

The environmental problems created by such conversion practices will make farming operations of adjoining lands more difficult and expensive. This could worsen the already hard-up situation most farmers are in. More poverty and further shrinking of opportunities for sustenance among the farmers could fan the fires of the insurgency movement which is not exactly new in this area.

The conversion of Barangays Lalangan and Sto. Niño into 'industrial estates'

Barangays Lalangan and Sto. Niño are two farming villages in Plaridel whose croplands are cultivated the whole year. Year-around cultivation is afforded by a highly developed and efficient irrigation system built in the area by the Philippine government.

The two barangays account for a yearly production of approximately 55,000 cavans of rice with a total value of ₱330,000. Most of the farmers also plant watermelon and other food crops between cropping seasons, which can give an additional income of ₱50,000 per hectare. Mango fruits yield earnings of ₱2,000 to ₱10,000 per tree. All in all, the two barangays can earn about eight million pesos a year.

Improved living conditions reflect the relative prosperity of the barangays. Most of the farmers interviewed live in concrete houses furnished with modern appliances.

Since mid-1989, however, some 113 hectares of rice and crop producing lands in these two barangays have caused much confusion among farmers who were also beneficiaries of the land reform program.

According to an informant, the (absentee) landowners of the estate residing in Manila sold the lands to Filipino-Chinese businessmen, reportedly from Manila, Bulacan, Binondo, Quezon City, etc. These businessmen applied to the Department of Agrarian Reform (DAR) for permission to convert the estate into an industrial site.

Local officials apparently supported the plan. The former Sangguniang Bayan (SB) passed a resolution designating the contested place as the industrial zone of the area. One SB resolution (No. 41) stated that both the landowners and the farmers have agreed to convert the land. Informants assert, however, that in reality, a majority of the farmers did not agree to the conversion plan, and instead were greatly disappointed with their local officials.

Aggravating the issue is the question of "disturbance compensation". According to Republic Act No. 3364, farmers should get at least ₱36,000 per hectare, but a town official thought they should not get more than ₱160,000.

In December 1989, in the face of the farmers' indebtedness, promises of employment, and constant pressure from a town official, some 40 of the 78 farmers were forced to give up their rights to the land. They were given ₱160,000 per hectare, an amount way below what the law stipulates.

Those who received this amount used it for different purposes. they paid their debts, purchased vehicles, distributed it among their children, etc.

However they spent it, the money was gone almost immediately and the promised jobs and homelots were nowhere in sight.

The conversion deal affected social relations in the community. Family ties became strained because of the problems it gave rise to. Farmers who did not sell their rights were discriminated against in the availment of loans, etc. Those who did sell and now needed jobs blamed those who did not because the latter are supposedly delaying the construction of the estate. Adding to the general frustration are rumors that the developers may not build an industrial estate, but a residential subdivision instead.

Most of the farmers who did not sell are strong and firm in their decision not to sell their rights to the lands. They have learned from the experiences of those who sold their rights, and would not want to repeat their mistakes. Yet they are afraid of what the future could possibly hold for them.

At present, all the farmers who did not sell only want to stay in the lands that they are cultivating because they find their present economic condition more stable compared to other livelihood scenarios.

The farmers believe that if the government really wants to help them progress, they should be given ample support. They believe that the agricultural development of the country should be given attention first before the country can make a great leap to industrialization.

As of now, the farmers continue to work on the lands that have sustained them and the members of their families all these years. They have decided to formally seek legal assistance for the problems confronting them. They know they have to protect their rights to the paddies so that their families will not be uprooted from the lands where they were born and raised, and where their families have survived for more than a hundred years.

Implications of land conversions

Land conversion and employment

The *Sangguniang Bayan* (SB) council of Plaridel and the group of businessmen who turned out to be part of a real estate corporation, projected that the land conversion deal will generate 6,000 jobs. In 1.27 hectares, two buildings with a floor area of 4,000 square meters each can be constructed and can employ 1,500 people each. In contrast, a hectare of land provides livelihood for only three to five members of a farmer's family. Thus, industry supposedly makes the land more productive.

Most farmers, however, believe that their advanced age, lack of technical skills, and poor educational background would lessen their chances for employment in the factories.

Many of them are not against land conversion for industrialization per se. They believe that their family members need jobs in factories. But they think that Plaridel, a well-irrigated and fertile area, should be spared and conversion done instead in non-productive and idle lands. While they welcome benefits that conversion will bring, such as medical facilities, generation of more employment, and revitalization of the economy, they also need bigger living space for the members of their extended families. A typical farmer-household consists of members of the nuclear family plus two or three other young families who live in a 2500-square meters homelot. The conversion program provides for only 300 square meters for each household. Aside from the fact that this may not even be given, the farmers fear displacement and relocation.

Effects on irrigation facilities

The land conversion scheme likewise highlights ill-conceived government policies. For example, according to the National Irrigation Administration (NIA) report on the Angat irrigation system, the government has yet to pay in full the foreign loans used for its construction. Converting the irrigated areas would throw away the millions of dollars borrowed from foreign creditors and paid for from the national treasury.

It is also widely believed that if the conversion pushes through, not only the farmers of Plaridel will be affected, but also the farmers of Malolos and other lowlying Bulacan towns like Paombong and Hagonoy which are dependent on the Angat irrigation system.

In addition, while conversion would allow the NIA to develop other non-irrigated agricultural areas since their service areas will diminish, this type of land development will greatly hamper the efficiency of their operations. Most of the areas being converted now are located in the upstream of irrigation canals. Often, the residential neighborhoods that occupy formerly irrigated lands use the irrigation canals that pass through their subdivisions as waste disposal sites. Thus, clearing up the clogged canals is one of NIA's recurrent problems. It requires more manpower and bigger operation expenses. In addition, clogged canals mean more water lost through seepage and evaporation. Thus, even NIA personnel feel strongly against conversion of agricultural lands.

Effects on the environment

There are speculations, based on the experiences of nearby towns like Valenzuela and Guiguinto, that industrialization of the town will cause pollution of the atmosphere, rivers, and irrigation waters. Valenzuela's light manufacturing industries, such as food canning and sardine manufacturing, has polluted irrigation waters which support several hectares of agricultural lands. In Guiguinto, a river which used to yield fish now teems with factory wastes. Further, the people believe that neighboring areas like Malolos and other lowlying towns will surely suffer from increased wastage brought about by industrialization.

Shrinking ricelands due to conversions will also diminish plant and animal populations in the town, and drastically alter the ecological balance of the area. "Displaced" insects or pests may attack and destroy in agricultural lands in adjacent areas.

Effects on land reform implementation

Majority of the farmers interviewed think that conversion is an initiative of landowners, and that they stand to gain the most from these deals. Conversely, the farmers believe that they are the losers in the process.

Specifically, they claim that the lands being converted should have been distributed to the farmers under PD 27. Most of them have been paying amortization since 1973, yet they still do not have titles to the land. Instead, the landowners are able to sell the lands to another party. Thus, conversion is a very potent means through which landowners can evade land reform.

Yet, land conversion should not be seen as exclusive of land reform. Both processes can bring about positive results to the economy and improve the living conditions of the population. One only has to recognize the most appropriate way of managing the land resource of the country.

If land reform is implemented, more employment opportunities will be created in the countryside. This will reduce the number of people flocking to the cities and lessen congestion.

If land conversion aims towards the building of a diversified agro-industrial community, owned, operated, and managed by the small farmholders themselves, then land reform will have the necessary support it needs to succeed.

Problems in the process of facilitating land conversion

The danger posed by the DOJ opinion

Different government agencies, like the Human Settlements Commission (HSC), Department of Agrarian Reform (DAR) and Department of Local Governmental Community Development (DLGCD) used to coordinate land conversion programs in 1977. The DAR, for example, has assumed the responsibility of approving conversions of agricultural lands by virtue of Republic Act 6657, or the Comprehensive Agrarian Reform Law (CARL) in 1988.

This authority, however, is effective only up to a certain period. The Department of Justice has opined that all conversions or land developments that coincide with the zoning and physical planning guidelines of town plans, made in consultation with a Task Force for the particular purpose and approved by the Housing and Land Use Regulatory Board (HLURB) on or before June 15, 1988, will not need clearance from DAR anymore.

While this opinion can make it difficult to convert agricultural land to other uses, it can also be used by some developers to circumvent DAR regulations, and facilitate their plans through fake documents, altered maps, and other "creative" ways.

Fortunately, the Department of Agriculture (DA) promptly realized the implications of this opinion and has called for a moratorium on land conversion under it. It also asked for a review of the town plans of the different parts of the country (CPAR, 1991).

The issue of local autonomy in regulating land conversion

Most studies and articles on land use conversion have tended to overlook the important role that the municipal government plays in the conversion process. This is unfortunate because it has the power to allocate parts of the municipality or city to various uses. The local Autonomy Act (RA 2264) and the Local Government Code (BP 337) empower local government units to zone their territories, subject to review and approval of the HLURB. At the same time, local officials are supposed to be most knowledgeable about the communities concerned.

However, the local government should have the proper perspective with regard to land conversion. They should really monitor land conversions in the municipality, not only for taxation purposes, but for proper utilization of the

community's resources for development. But they need sound physical and social development guidelines to do this.

In spite of the presence of properly conceived guidelines, other issues which can work against effective implementation of land conversion programs by the local government include abuse of power by those in authority; political motives and plans of specific officials; and protection of personal interests, as exemplified by the preferences of the national government's landlord-dominated Congress.

What should be done when it is the local executives who are not following conversion guidelines and are working in the guise of facilitating industrial development?

It should be made clear that the desirable type of local autonomy and decentralization is one that is participated in by a citizenry that is conscious and informed about available resources. Local autonomy is not risky if an organized and concerned community can regulate and check the way their leaders are handling the development of their land resources.

Also, it is strongly suggested that considerable effort be exerted on zoning, which constitutes the initial steps of the conversion process. It is during this phase that decisions are made regarding which portions of the town or the city should be used for agricultural or commercial zones. The town plan or land use plan is the basic reference document of the DAR in taking action on conversion applications. To further improve and institutionalize the zoning process, the town planning group could include representatives from the DA, DENR, HLURB, NEDA, DAR, etc. and it can benefit from the help and assistance of members of the academe.

Lack of coherent information on actual rates of land conversion in the country

This study has determined that there is a discrepancy between the reported and actual cases of conversion in the country by using the data of Plaridel.

That 65 percent of the total conversion schemes in Plaridel did not go through the DAR is a discouraging indicator. If the implementors mandated to approve and facilitate conversions do not closely watch the indiscriminate conversion of farmlands into subdivisions, agricultural lands will unscrupulously be converted into different uses. Local and government officials must get their act together to project seriousness and sincerity about the proper utilization of limited resources.

Some misconceptions on securing clearance for conversion

A discouraging aspect of securing conversion clearance is that it can be interpreted simply as a matter of compliance with documentary requirements. This trivializes the issue of conversion into a simple problem of compliance with documentary requirements.

Should it get down to that level, then perhaps the DAR can require a more comprehensive evaluation from different government agencies and private groups asking for conversion clearances. Instead of a one-paragraph certification that the proposed land use being planned for by the developer is ecologically sound and will not be environmentally problematic, the DAR can possibly require an environmental impact study of the proposed project.

The need to assess the agricultural land resources of the country and to come up with an appropriate national land use policy

Agricultural lands in relation to development must not merely be regarded as a factor to increase man's economic prosperity. It must be seen as an important resource for man's continued survival.

The possibility of developing more productive alternative land uses disappears as vast areas of lands are rapidly converted into residential and industrial estates. Once an inappropriate land use scheme is applied, degradation is often an expected outcome. It is an imperative then to apply an appropriate land use plan to any land resource.

The development of agricultural lands then must be seen in relation to the particulars not only of the physical components of the area, but of the inhabiting communities as well. Sound land resource development calls for sensitivity to economic, ecological, and ethnic considerations.

For example, assessment of agricultural land capabilities must also consider soil characteristics, topography, drainage systems, accessibility, etc. It must be seen in relation to the capability of the ecosystem to maintain a continually productive area to be able to support a community.

Lack of exhaustive land assessment characterizes conversion activities in Plaridel. The proliferation of residential subdivisions exhibits an unsound economic allocation of the land. The fact remains that there are other possibilities that will bring about greater productivity, not only for the farmers, but even for original landowners.

There is also a need to delineate how much land will be devoted to what use and where they should be located. Land, which is a limited resource, is needed for food production, housing needs, industrial activities, and ecological balance. Regulating its use, a comprehensive national policy needs to be drawn up and implemented as soon as possible.

The Department of Agriculture (DA) has initiated such a process. It has started by defining the areas reserved for agricultural activities. This delineation of protected areas, however, will be meaningless unless clear-cut guidelines on how different types of lands apportioned to different uses will be effected into laws. The government needs to come out with a definite stand on how national land resources must be handled and managed in relation to the development goals of the country.

Specifically, the following can be initiated to help formulate an effective land use policy for the country:

1) *Creation of the national land use map and a plan that will allocate land resources for different uses according to equitable development priorities and the physical, spatial, and infrastructural features of the lands.*

One can start by collecting, on the municipality level, ecological baseline information by mapping land resources of the area. The resultant maps will serve as guides showing the existing characteristics and potentials of the lands. This can lead to the identification of alternatives that different regions may actively pursue. The government can then define several appropriate development strategies that can be used based on the mapped out information. This, of course, needs coordination and commitment from the primary implementing agencies, government bureaucracy, concerned institutions, and the citizenry.

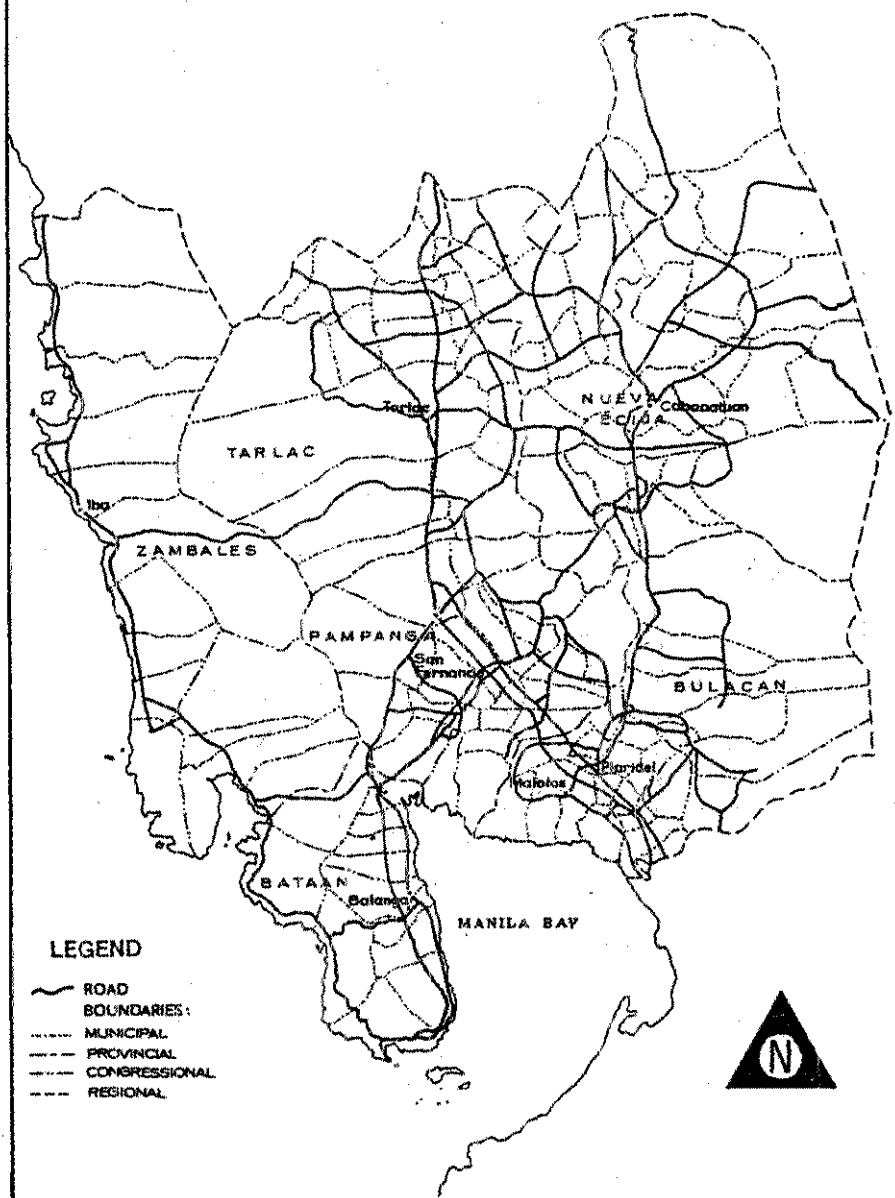
2) *Formation of a citizen-based organization in every municipality that will plan and monitor the implementation of the land use policy guidelines.* The community will then be responsible for looking after the conditions of the farmers and landless workers that will be affected by the implementation of these land development activities.

The nongovernment organizations can help by strengthening and organizing community organizations whose primary concern will be monitoring the land development and conversion process. They may also be responsible for figuring out the most reasonable land conversion distribution package for the farmers and the need for some valuation formula that will tax and regulate the process of conversion. As a result, the community's self-reliance is developed, along with a more popular form of getting information about community resources.

3) *Members of the academe can actively participate in the process.* They can make these communities their actual areas of study. They can teach information gathering techniques, as well as ways of developing data base and monitoring systems. Technical skills, such as mapping the resource base of an area, understanding spatial arrangements, and undertaking resource analysis and allocation can be shared with the government functionaries and citizen's groups in the area. Exchange of local information and people's experiences should be facilitated. All these may lead to the creation of national land use policy that is based on the community's understanding of the potentials and limitations of their resources.

Figure 1

PLARIDEL, BULACAN: GATEWAY TO CENTRAL LUZON



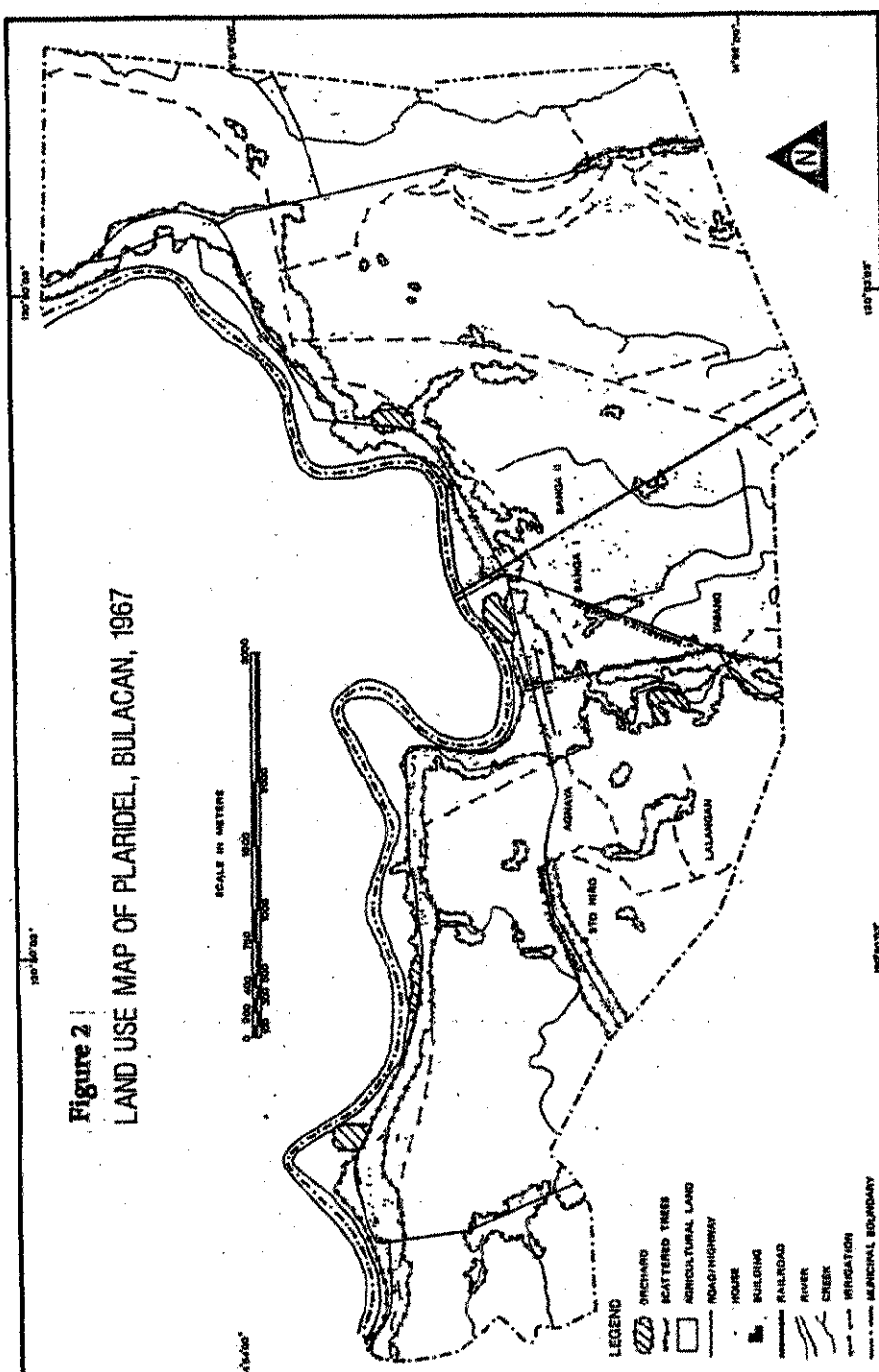


Figure 2
LAND USE MAP OF PLARIDEL, BULACAN, 1967

Figure 3
LAND USE MAP OF PLARIDEL, BULACAN, 1981
SCALE IN METERS
LEGEND
ORCHARD
SCATTERED TREES
AGRICULTURAL LAND
AIRSTRIP
ROAD/HIGHWAY
RAILROAD
BUILDING
HOUSE
RIVER
CREEK
IRRIGATION
MUNICIPAL BOUNDARY
BANGA II
BANGA I
TABANG
AGNAYA
STO NIÑO
LALANGAN
N

Figure 4
LAND USE MAP OF PLARIDEL, BULACAN, 1987

Figure 5
LAND USE MAP OF PLARIDEL, BULACAN, 1991

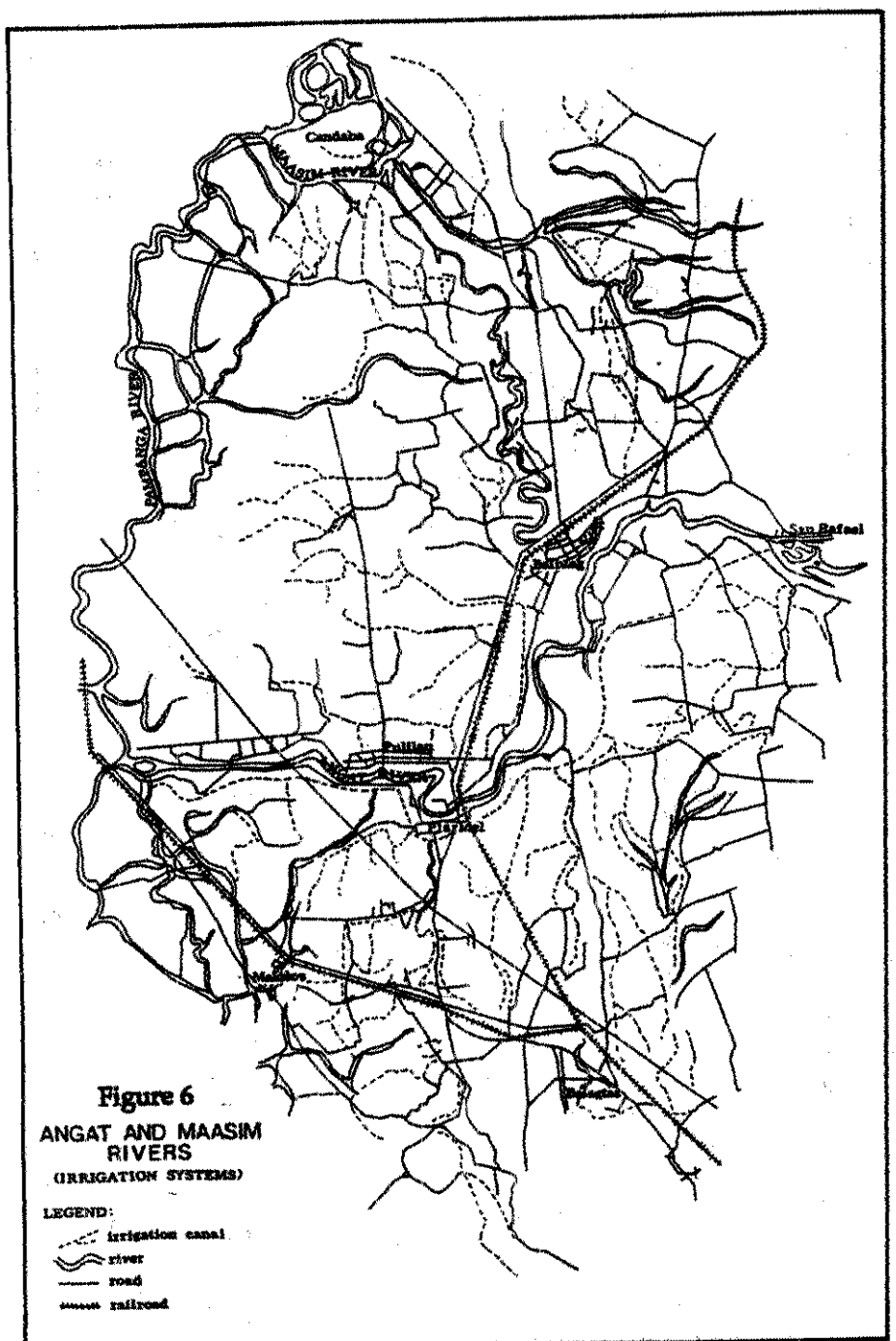


Figure 6

ANGAT AND MAASIM RIVERS
(IRRIGATION SYSTEMS)

LEGEND:
- irrigation canal
- river
- road
- railroad

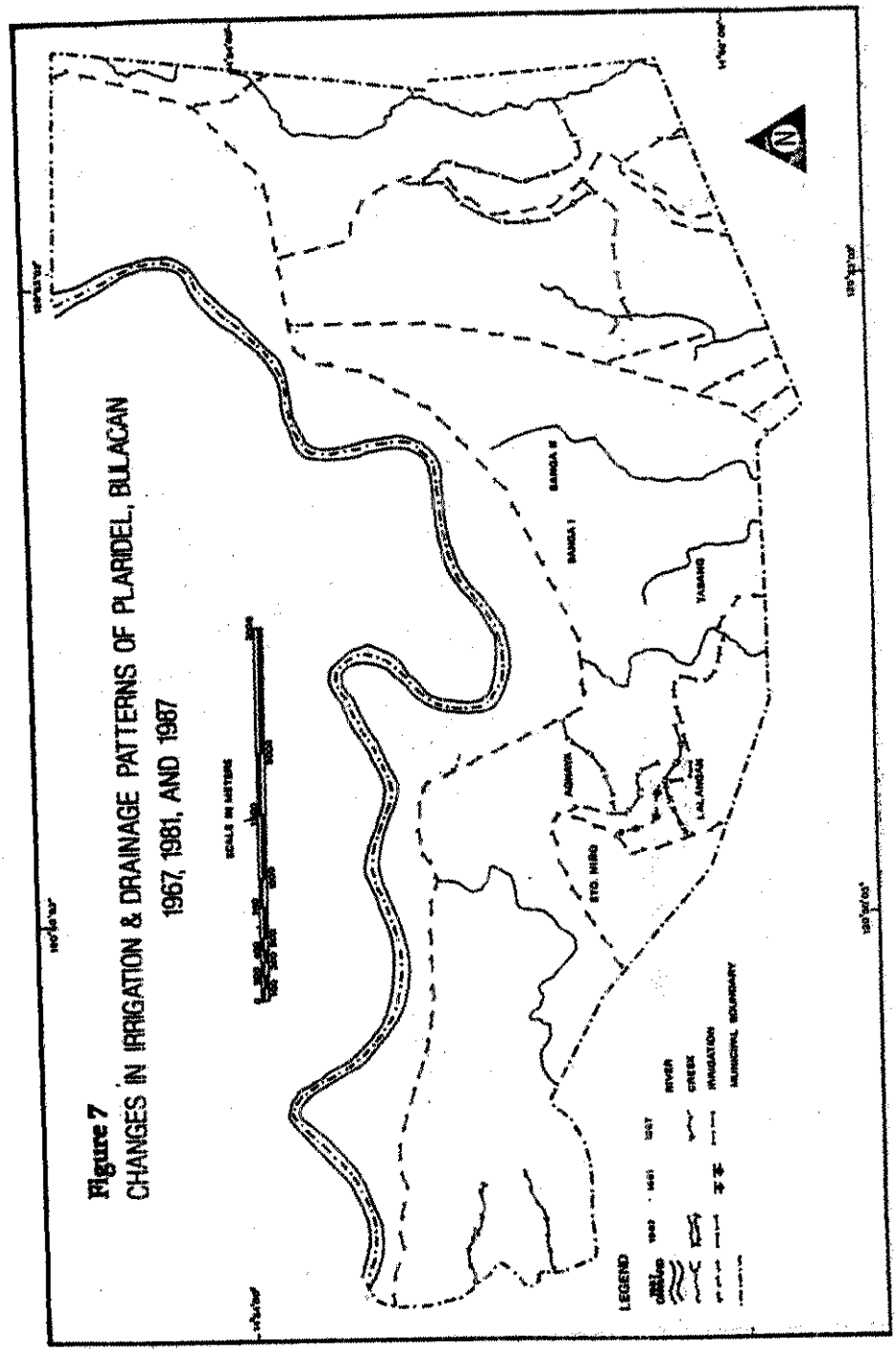


Figure 7
CHANGES IN IRRIGATION & DRAINAGE PATTERNS OF PLARIDEL, BULACAN
1967, 1981, AND 1987

Figure 6
GROWTH OF BUILT-UP AREAS IN PLARIDEL, BULACAN, 1967, 1981, AND 1987

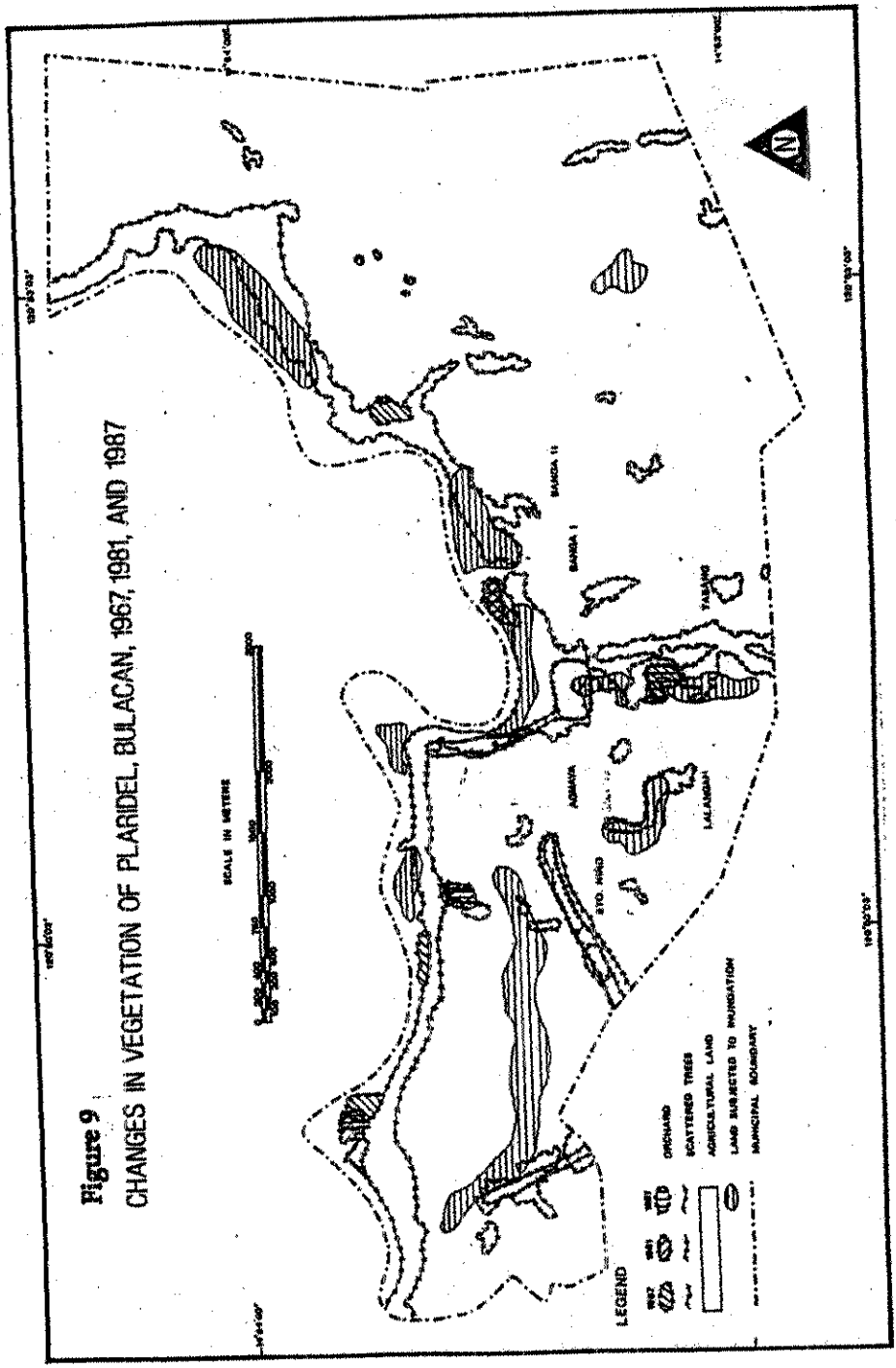
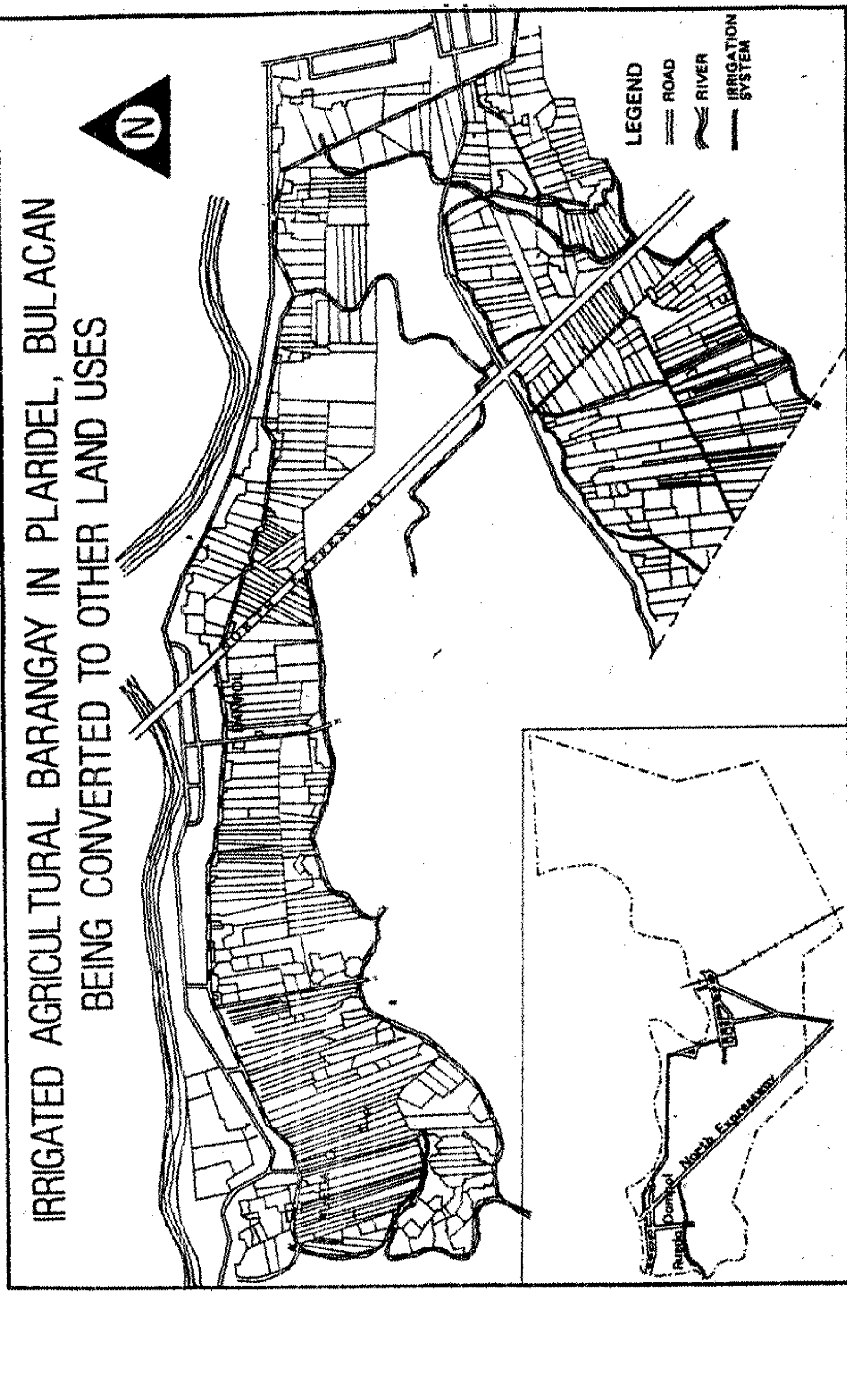


Figure 9
CHANGES IN VEGETATION OF PLARIDEL, BULACAN, 1967, 1981, AND 1987

Figure 10



IRRIGATED AGRICULTURAL BARANGAY IN PLARIDEL, BULACAN
BEING CONVERTED TO OTHER LAND USES
N
LEGEND
ROAD
RIVER
IRRIGATION SYSTEM
North Expressway