

THE IMPACT CAUSED BY THE CONSTRUCTION OF ITAIPU HYDROELECTRIC RESERVOIR IN THE NEARBY
URBAN STRUCTURES

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ABSTRACT:

The purpose of this study is to demonstrate changes caused by the construction of Itaipú Reservoir in Paraná State, South of Brazil, through differences in the growth rhythm of the cities which are close to each other and nearby the generating plant. This study, based on aerophotos and satellite LANDSAT TM 5 digital data, evaluate this impact in urban structures of Fóz do Iguaçu and Guaíra cities.

KEY WORDS: Cartographic, Economic, Image Interpretation, Photogrammetry, Thematic.

1. INTRODUCTION

The dynamic of Brazilian cities expansion usually depended on prefectural plans. With the new Constitution of Brazil, in one of it's article, cities over 20.000 inhabitants should have a directive plan.

In Paraná State, these plans were developed under the guide of many enterprises. The district development depends on whether the directive plan will be accomplished or not. The settlement of priorities must guide the development of the selected areas which will receive fund in order to achieve it as well as population needs.

The county is managed with income taxes that provide development and investment.

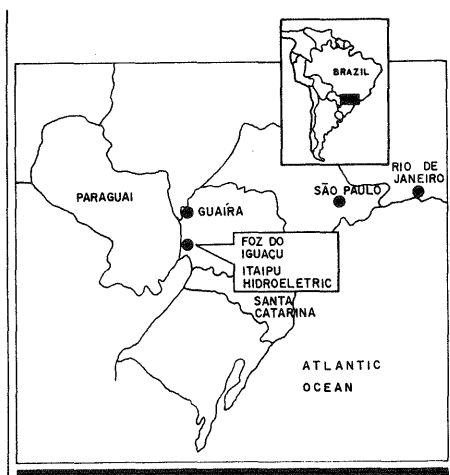
This fund is generated mostly by economic activities. Tourism is increasingly one of the most important sources of income taxes, specially concerning those districts which have some kind of tourism attraction. Tourist attractions are usually related to natural resources such as parks, lakes, water-falls, useful arts, beach, etc...

Notwithstanding cities expansion plans concern urban centres, a new fact such as the construction of a generating plant can fundamentally change the future

development of the district involved.

The Purpose of this study is to demonstrate; with help of satellite LANDSAT TM 5 images, aerophotos and social-economic informations; that building trades such as the construction of Itaipú Reservoir can deeply change the natural development of nearby cities - Fóz do Iguaçu and Guaíra.

The subject of this study are the urban structure, of these cities located at extreme West and West of Paraná State. Several years ago, both cities had well known international touristic attraction, homogeneous population and alike demographic rates. (Fig.1).



However, Fóz do Iguaçu took the benefit of Itaipú Reservoir construction due to its localization while almost none was brought to Guaíra.

The main objectives of the study are: 1)- get available data of the districts concerning urban impact. 2)- get

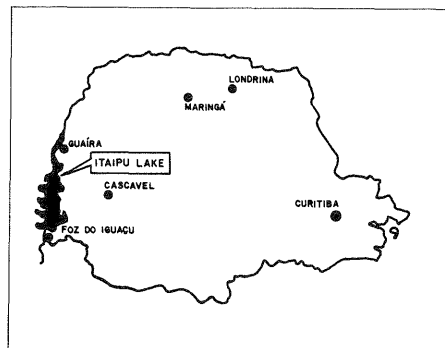
available data that could provide management corrections caused by this impact. 3)- contribute to elaborate a development plan based on real data taken from the impact. 4)- demonstrate that the district urban community participation is of great importance whenever a decision can change the future life of a city. 5)- At last, as Lange Jr. and Maximiano(1990), demonstrate that artificial satellites are of great importance concerning real informations about the environment and its disposal to the public.

Analyses and manipulation of pixels values trough computers provided by orbit image process in digital format is one of the methods of getting information.

2. METHODOLOGY AND MATERIALS

2.1. Area of Study

As the subject of the study is the impact caused by Itaipú Reservoir construction, the chosen areas were Fóz do Iguaçu and Guaíra cities, in West of Paraná State.(Fig.2).



2.2. Materials used

In order to develop this paper, panchromatic aerophotos dated 1953, 1963 and 1980, scale 1:25.000 were used in order to identify and delineate urban structures of the cities involved.

Nineteen sixty-three aerophotos 1:10.000 scale were used to identify and compose cartography data of that time.

Satellite LANDSAT TM 5 orbit image was used as main study at orbit-point 224/78 dislocated six seconds north on 19/05/91 in digital format - streamer data disk, LANDSAT TM 5 images in colour paper, 1:250.000 scale orbit point 224/78 on 02/09/89 and 224/77 on 18/09/89 and TM 5 scale 1:100.000 images in colour paper orbit point 224/78 B on 12/10/86 and 224/77 B on 09/08/86 were used as a support and preliminary analysis.

Urban plants of Fóz do Iguaçu and Guaíra, scale 1:10.000 dated 1990 were also used at the present study.

As additional support, social-economic data about the two cities were taken from official institutes.

A PC-AT type microcomputer, SITIM-150 software, digital table, MAXICAD software are used to this study.

2.3 Methodology Used

The method of work comprised basic interpretation of aerophotos of Fóz do Iguaçu, scale 1:25.000 dated 1963 and Guaíra, scale 1:25.000 on the same year to compose cartography data.

After recording LANDSAT TM 5 digital data in computer, analysis were made in order to get the ideal combinations that would best characterize urban structures during interpretation.

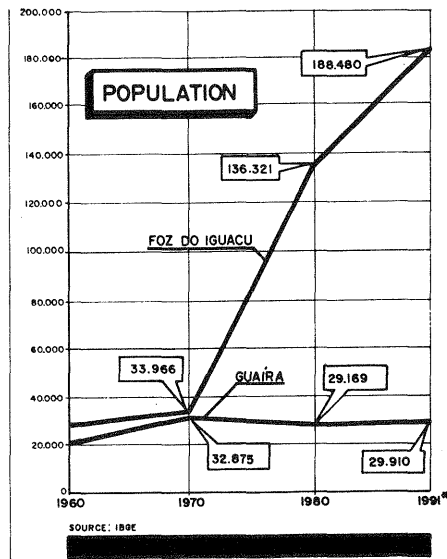
As the band combination that best represents this structure was identified, the material analysis was possible.

Information based on interpretation of satellite digital image on 1991 of Fóz do Iguaçu and Guaíra were recorded in colour photographic paper in 1:250.000 approximate scale.

3.RESULTS

Urban plants mapping from aerophotos scale 1:10.000 on 1963 and results from the treatment of satellite LANDSAT TM 5 image were overlaid and demonstrate that urban expansion of Fóz do Iguaçu was of great importance when compared with urban expansion of Guaíra.

Nineteen ninety-one demographic census confirms the reality shown by satellite image. (Table 1).



4. SUMMARY AND RECOMMENDATION

This work was basically a pilot-test of Satellite LANDSAT TM 5 digital data and images have been effectively used to show the spatial variation of urban sites and several relationship between aerophotos about cities expansion. The destruction of Sete Quedas Falls, touristic attraction of Guaíra and one of the most important sources of fund, affected natural development, keeping urban structure and population almost the same. On the other hand, Fóz do Iguaçu saw an important urban expansion due to the large number of people that arrived since the beginning of Itaipú Reservoir construction. The city kept its main fund source - Iguaçu Water Fall and got another - Itaipú Reservoir which is visited by hundred of thousand people. Among other factors that contributed to Fóz do Iguaçu expansion, are the sale of

foreign products from Ciudad del Leste in Paraguay, through Amizade bridge, Tancredo Neves bridge construction between Brazil and Argentina and the Big Itaipú Lake.

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