

TITLE: IMPACT OF PHOTOGRAMMETRIC SURVEYING AND MAPPING ON
DEVELOPING COUNTRIES' ECONOMIC PERFORMANCES

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ABSTRACT:

An Analysis of the Present Level and Progress Rate of Photogrammetric Surveying and Mapping in Developing Countries of the world shows an insufficient Natural Resources and Geographic Information Needed to cope with the Developing Countries Major Economic problems, such as; high Percentage of poor standard of living, political instability, civil Strife/ War, Ecological disasters, Population Explosions and poor Economic - Growth rate.

Undoubtedly, if greater percentage of the Developing Countries National Revenue are spent on Inventory, Interpretation, Mapping and Analysis of all the available Natural Resources, and made accessible to Economic planners, Investors and Developers. It will diminish the delays in the exploitation, development and management of Natural Resources; such efforts will necessarily boost the Economic performances of Developing Countries in the National and International framework.

INTRODUCTION

One of the major reasons for the persistence under development in many countries of the world today is due to inadequate Exploitation and development of all existing Natural Resources. On the other hand, the few developed wealth are not evenly distributed. The results of course are: The high percentage of poor standard of living, political instability, wars or civil strife, population Exploitation, Ecological Disasters, and Low Economic growth rate.

Other reasons might be historical factors, Religious Conditions, or even the Climatic Environment of countries.

Existing Economic System in most developing countries of the world do not make adequate and appropriate budgetary allocation for the acquisitions, processing, analysis, and conversion of all available Natural Resources data into a form that represent a valuable information that could attract investment from developed Economy and as a reliable planning tool for Economic policies formulation.

However, Economic and Technical Assistance programmes established by international organization in most developing countries of the world are making a considerable Economic impact in this regards.

Nevertheless, these international organization efforts have not achieved much in its desire to maintaining a stable political and social conditions in Developing Countries of the world. Evidence are: wide spread civil strife or wars, high speed in political Transitions, Erosion menace, Deforestation and Desert Encroachment, just to mention a few.

The situation is even made worse by the present Global Economic Recession, resulting in a zero percent growth for Developing Countries Economic Performances (U.N. Surveys Report, 1991).

The problem of insufficient Resource/ Geographic Information should be a major concern, considering the fact that more than half of the worlds' population are already undernourished, at the same time, the population growth rate in the Developing Countries follows a geometric progression.

In most countries, the concentration of people in the Urban Area keeps increasing from (1/3) one third in 1950 to (2/3) three quarters in 1990. To cope with all the

identified problems, it would be necessary firstly, to take urgent steps to increase heavily the production of foods by means of Large Scale Agricultural Engineering Projects, such as Agrarian Reforms, Land improvement, irrigations, Drainage, Land Reclamation, among other modern technique, Secondly, to invest heavily on the Exploitation and Developing Adequately all the available Natural Resources.

For effective implementation and realization of such Large Scale projects, Photogrammetric Surveying and Mapping products are the necessary planning inputs and working tools.

At the initial stage of the project planning, Aerial photography and Satellite imageries at reasonable Scales and Quality will play a predominant role as the basis for preliminary Explorations of the existing Natural Resources, Determination of Agricultural potentials and as a support for photogrammetric Map compilations. Over the years, the issue of Capital has always been an impediment to Developing Countries efforts in projects implementation, apart from insufficient number of qualified Specialist.

This formidable task of Capital generation can only be solved by means of Rapid Exploitation of the existing Natural Resources and Conversion of these resources into a mobile capital (Geographic/Resource Information).

The task of providing a reliable geographic/Resource Information, necessarily comprehends as its first phase the Establishments of an inventory of all the existing Natural Resources, This operation can only be accomplished through the preliminary photo-interpretation, Image Analysis and photogrammetric map compilations.

However, most Developing Countries of the world do not have the required Technology to convert their Natural Resources into a mobile capital - (geographic/Resource Information) as compared to developed countries where the growth direction and Time Scale of geographic/resource Information Technology is driving competition.

It might be emphasized here that there will be no Regional and Economic

Integrations in Developing Countries of the world and that of Africa in particular without a reliable geographic/Resource Information. Conversely, there will be no reliable geographic/resource information without adequate investment in the Technology.

At the International Level, attempt is partially being made by international organization, e.g. U.N. towards assisting developing countries solve these problems of Technology Development, complemented by the assistance offered by highly developed countries e.g. U.S.A., Canada, U.K.

In dealing with the problem of geographic/resources Information Technological Development, the following issues needs to be critically addressed. There are:

1. What is the actual status of geographic/resource Information Exploration in various Developing Countries of the world.

At this point it will be expedient to define the term geographic/Resource Information Exploration in the context of this paper. It implies, broadly speaking, Land Surveying, Coverage of Geodetic Triangulation, Determination of ground control points, Aerial and Terrestrial photography, photo-interpretation, compilation of all possible kinds of maps by photo-grammetric methods for all kinds of application except military applications, and Map Reproduction.

2. Can the annual progress accomplished at the present time in these field be considered as sufficient and satisfactory for an efficient technical and Economic Development of the countries in question.

3. What percentage of the National Revenue and of the Public Expenditure is presently spent for geographic/Resource Information Exploration.

Are the Actual Yearly Expenditure adequate for an efficient technical and Economic Development of the Nation in question.

4. If the yearly achievements in this regards is considered insufficient for a given country, what has to be done to improve the situation?

Department of Photogrammetry, Laval University, Canada, has been conducting Research since 1966 to offer solutions to the above questions.

The result of that research project for developing countries shows a very low level of progress in geographic/Resource Information Exploration and Technological Development.

ACTUAL STATUS OF GEOGRAPHIC/ RESOURCE INFORMATION EXPLORATION

In all photogrammetric Map Compilation projects, Geodetic Ground Control Points are very vital. An inventory of the present coverage of Geodetic Ground Control Points in Developing Countries of the world and Africa in particular shows that about one third (1/3) of the Land area is covered by principal arcs, measured approximately between 100 and 150 kilometres. In some countries e.g. Nigeria, these gaps are filled in with first order geodetic Triangulation Network.

For Agricultural Engineering and Resource Development projects, Medium Scale Maps at a scale of 1.250,000 to 1.50,000 are essential. The production of such maps requires a more denser Network of controls than the vertical and horizontal Network of controls provided by the principal arcs, investigation, reveals that a little less than one third of the Land Area is covered and densed enough to permit compilation of maps at Medium Scale (African Situation).

Large Scale Maps are required for all Town Planning and development functions, to compile map at such a scale, geodetic ground controls points should be per square kilometres, such density of controls is not found anywhere in Developing Countries except for special purpose applications.

It is evidence from this brief Analysis that the Extension of geodetic ground Control Network do not progress at the rate required for effective inventory of Natural Resources, Explorations and Photogrammetric Map Compilation projects. Studies shows that only small scale mapping (1/1,000,000) at National and International Level are on progress due to the Technical Supports given by international organization, e.g. United Nations.

United Nation Cartographic Reports shows the following percentage of coverage at the respective Scales world wide (emphasis on Africa).

1:250,000 or Larger	About 35%
1:100,000	- between 15 - 25%
1: 25,000	- About 5% including cadastral plan.

The most valuable map needed for Natural Resources exploration are topographical maps of scale 1/100,000 or Larger, from the above records, maps compiled at that scale covers less than 25% of the land area, and at 0.3% progress rate annually.

Evaluation of the Existing Maps in developing countries of the world today reveals that most of the maps are out dated and the information contains therein are misleading when compared to the actual situations it attempt to depict on land. But such maps are still being use by Planners and Administrators. The effect of using out dated land information to plan for future development on the current land situation can be very disastrous, particularly in the urban set up where the rate of change in both planimetry and topography sometimes needs a complete remapping of the area in question at a very short time circle. For rural areas maps should be revised periodically to accomodate feature changes in the areas mapped, but this is seldom done in developing countries. The present level of mapping in developing countries posed a serious challenge to all the professional disciplines and specialists involved in the production of geographic/resource information.

EXPENDITURES

The expenditures for photogrammetric Surveying and mapping for each country must at least be proportioned to the total National Revenue and its annual public Expenditure. The determination of the actual amount spent presently for this purpose is not an easy task, considering the political implications of such data.

However the following approximate data were last collected between 1966 and 1976.

Total yearly Expenditure for Surveying and Mapping in the entire world - approximate \$1,350,000,000 (dollars) or 0.08 percent (or approximate 1/1,000) of the National revenue - (1)

0.26 percent (or approximate 1/4 of one percent of the public Expenditures - (2) or \$10.30 (dollars) or (approximate 10 dollars) per square kilometres (3) or \$0.41 (dollars) (approximate half a dollar) per in habitant. - (4)

The above data, though out dated can be used as a preliminary thumb rule to estimate the average yearly fund which might be spent at the present time by each respective country for its geographic/Resource information Exploration.

Note that 4 Values will be obtained if the 4 rules are applied; Brandenberger 1968, opinioned that for a country with a low population density and eager to make an inventory of its resources Rule (3) is most adequate. Those with high population density - Rule (4) is recommended.

Effort should however be made to update the data at National or International level considering its importance. Such data could be used to determine the actual losses in billion of dollars in the world economy for too slow and annual progress in geographic/resource information exploration. The data will also determine by what rate the annual progress should be in the framework of national and International Economic growth.

CONCLUSION AND RECOMMENDATIONS

It can therefore be concluded that, the progress rate of geographic/resource Information Exploration and the Technological advancement in this regards is far too slow compared to the complexity of problems of which such Information and knowledge could have been used to solved. There is urgent need for Government, international organization, specialist in the field of surveying and mapping to restructure their commitments in order to create the deserved impacts in the Economy.

The degree of each individual commitment and contributions can however be determined through research.

Efforts should be made by respective government to consider as a matter of urgency, stepping up its financial investment in the technology, training and Education of specialist in the surveying and mapping professions, and the Adaptation of modern technological approach to Geographic/Resource Information Exploration.

In its Human Development report of 1991, the U.N.D.P. said success in this direction would also require a major restructuring of Economic policies of developing countries especially investments that affect human development, in order to create a more prosperous future for Developing Countries; the report urge developing Nations to change its investment pattern most especially in military spendings in order to invest more on human development needs. Massive investment

in geographic/Resource Information Technology will create a positive impact in Developing Countries' Economic Performances.

This implies that all problems associated with poor Economic Performances could be over-come with the application of the numerous benefits Geographic/Resource information technology stands to provide.

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