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MAPPING FOR DEVELOPMENT  
(A PRIORITY FOR DEVELOPMENT PROJECTS)



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FOR  
DEVELOPMENT**

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## MAPPING FOR DEVELOPMENT

( a priority for development projects )

### ABSTRACT

In 1985 , the World Bank analysed 1.00 development projects in which it had participated during the previous decade . Other organizations , extending some of those investigations shortly afterwards , attempted to identify the mechanisms which had contributed to the success of some of those projects . This report , on the other hand , examines the failure of certain development projects , and makes it possible to see that the lack of mapping adapted to those projects was one of the major reasons , amongst others , for their failures .

The investigation reported here attempts to define what must be done to remedy such difficulties , how to do it and who have to do it ; it opens certain avenues for those considerations and it leads to two important questions :

- Must the adapted mapping necessary for development projects evolve in parallel to the basic mapping , follow it ?

- Will it be necessary in the future to modify the responsibilities and general structure of institutions in charge of cartography .

The conclusions to which they will lead have a real impact on environmental problems .

In 1985, the World Bank decided to request experts to analyze 1 000 development projects which it had financed in previous years in order to judge the results obtained and to consider any failures which might have occurred. That investigation was intended to draw a number of conclusions so as to be able in the future to better define one (or more) financing policies, to seek, if it was necessary, remedies for the difficulties encountered, but above all to avoid the errors which might have arisen at all levels from the definition of the terms of reference to the follow-up of the execution in the field.

That investigation with a few specific differences due, in particular, to physical difficulties, local contexts, climatic conditions and the efficiency of executing officials showed that in West Africa, one project in three, and in East Africa a little more than one out of two was a failure it being understood that in those percentages were included those projects which broke down completely or which were finally abandoned.

I do not have details about the errors noted and the decisions which were taken, but it is remarkable to see that this problem of difficulties or failures of certain development projects has been increasingly taken into consideration by government representatives, various officials and users. For instance, during the 6th United Nations Regional Cartographic Conference for Africa held in Addis Ababa in November 1986, the participants insisted on and emphasized the fact that in numerous cases, those persons responsible for executing development projects are confronted from the beginning with the absence of cartography adapted to the projects .

In the opinion of the participants at that conference , most of them officials in their own countries, **THE ABSENCE OF MAPPING** adapted to a project, i.e. that gap, is one of **THE MAIN REASONS FOR THE FAILURE** or delay, or postponement or abandon of certain development projects.

During that conference, the discussions on that subject assumed an exceptional character and gave rise to dense contributions, sometimes vigorous, and many proposals. In any case, those discussions revealed that the problems raised were

becoming increasingly acute. Inserting themselves fully into the framework of the recommendations of the Heads of States and Governments appearing in the Lagos Action Plan and in the Priority Programme for the Economic Re-establishment of Africa, they follow upon many resolutions adopted by different United Nations Regional Cartographic Conferences for Africa.

Following upon the work of that Sixth Cartographic Conference, the African Cartographic Association (A.C.A.), now merged with the African Remote Sensing Committee (A.R.S.C.) to form the African Organization for Cartography and Remote Sensing (A.O.C.R.S), was requested to seek the best adapted means in order to undertake an investigation as complete as possible in order to avoid recognized and detected mistaken procedures and to make concrete suggestions for new management procedures. Those suggestions, at a later date, after having been approved by a certain number of authorities, will be proposed to political and technical officials as well as to those national and international groups which fund development projects.

I wish to mention that, financed by the European Economic Commission (EEC ), that investigation must be concluded by mid-1993. It was piloted by the A.O.C.R.S. Secretary General with the support of a Coordinator and a group of African experts distributed as equitably as possible by geographic zone and various regional influences, notably linguistic. You can easily guess that a study with such a wide coverage was not carried out without difficulties, but I can assure you that the selected participants, right from the beginning of their activities, have shown that they were fully convinced of the advantages of the project in which they were engaged : that was the minimum token necessary for its success.

The first phase of that enquiry is about to be concluded, and I can tell you, here and now, not only what we can hope for in the way of results but also speak about my personal reactions, make some comments, and finally mention the hopes that I have and discuss some of the concrete proposals which are beginning to be formulated. To those persons, who request it, and if it is still necessary to convince those persons who still hesitate, I can supply a list, not at all exhaustive, of examples of development projects for which sufficient or adapted cartography did not exist or which was not planned for production before signature of those projects. You will of course understand that the list has been deliberately restricted in length and is very discrete ; it makes no reference to a country or a contractor, or to financing organizations, unless written permission was granted beforehand. That list is sufficiently detailed to show that :

- A. Cartography is of fundamental importance in the majority of development projects, of all kinds, often very different and sometimes in the operations, or the research, where its necessity is not a priori evident. Does one need cartography when studying profitability before implanting a processing-factory ? Does one also need cartography for planting palm-oil trees in ground and climates already recognized as being favourable by agronomists ? Does one also need cartography for organizing population displacements , developing the rearing of cattle , etc...
  
- B. Worldwide and local financial losses that one can imagine due to the fact of not having taken into account the required cartography are large. The total amount of those losses is often difficult to estimate, especially as the estimated cost of a project, a cost covered by a financial funding group, is often only a small part of the loss ; the charges related to preliminary studies , the search for solutions, the drafting of the contract specifications, etc, are not negligible either but are often forgotten in the detailed accounts.

One must also take into account the psychological and moral losses which affect those persons who participated and those who hoped whilst waiting for the results.

To summarize.

DUE TO A LACK OF SUFFICIENT OR ADAPTED CARTOGRAPHY NUMEROUS DEVELOPMENT PROJECTS BREAK DOWN, are delayed or do not attain the planned objectives. In all cases, that leads to A LOSS OF MONEY and to non-negligible, probably CONSIDERABLE, losses. If it is rather difficult to give accurate figures, we can, however , imagine and apprehend the importance of them with only a few examples :

- A. If a cellulose factory, once constructed, cannot become operational, the construction-costs, certainly several hundreds of thousands of dollars, are lost ; that is useless expenditure.
  
- B. If a telecommunication link project, due to the lack of a cartographic study and to bad decisions at the



beginning, necessitates 2 or 3 million dollars of supplementary operations ; that is a waste of money.

- C. If a population-displacement project is undertaken without first having made a cartographic study of possible reception sites, then the logistics charges per family to be displaced will be increased. (At the beginning of the project, without cartography, \$ 25 000 ; reduced to \$ 10 000 , using a simple aerial survey undertaken because the Project Manager had insisted after seeing his budget decreasing rapidly) : that is useless expenditure.

I don't believe it is necessary to multiply these examples, but it is probably necessary to better grasp and better define that which is and must be SUFFICIENT CARTOGRAPHY , that which is and must be ADAPTED CARTOGRAPHY. Such definitions are not new and all cartographers have asked themselves questions about them, even if they only concerned what was termed a few years ago as basic cartography, but the choices they made were in all cases the result of consultations between themselves and the users. Perhaps we should spend a few moments looking into this question.

SUFFICIENT CARTOGRAPHY can obviously vary widely both in accuracy as well as in the volume of information to be produced in the end, e.g. for navigators if they navigate on the high seas or if they wish to enter a port. It is always like that, i.e. depending on user requirements. The explorer many years ago was satisfied with small-scale maps, showing several reference markers to help him orient himself, a few places where he might contact people and some outstanding sites. Later on, the available knowledge about regions and countries required more detailed , more complete mapping which , in turn , rapidly became insufficient when countries became aware of their potentialities and wished to organize themselves and, when necessary, defend themselves ; mapping itself needed to evolve, to become more accurate, more detailed, sometimes even thematic , in order to satisfy increasing user requirements.

Currently the technical procedures, the means available to everyone, are such that they make it possible to produce exactly and without difficulty the mapping required by an user. The problem has been displaced and to be successful it is no longer a problem of means but a problem of identifying the requirements. It is necessary to define the latter , to know how to define them unambiguously (we will see later on that this problem is in fact that of the "drawing-up of terms of reference"). The difficulty to be overcome is evidently accentuated when the choice of a cartography has to be made and it has to be inserted into a development project. That

difficulty is never easy to solve and in any case it can never be easy without perfect and often long consultations between the contractors, users, and sometimes political officials and those groups funding the operations.

If that problem has been partly solved by today's cartographers for the SO-CALLED BASIC CARTOGRAPHY, it is otherwise for the cartographic operations required for development projects and the procedures for seeking those solutions and their systematic insertion have not yet been generally agreed. It is certain that the choices are different each time, i.e much less evident; in addition, one must not only seek sufficient cartography but the latter must also be adapted;

ADAPTED CARTOGRAPHY is infinitely variable .

- A. The search for a road-route can be undertaken either on aerial photographs or on processed satellite imagery. It is the quality, cost and supply rapidity which will influence a choice.
- B. The search for gradients or insolation (plantations) depends on the altimetry, or even the Digital Terrain Model, which is necessary, whilst the planimetry and place-names are of little use.
- C. The highest contour of a dam-reservoir only requires field surveying operations.
- D. Etc, etc, but I will limit myself to those few examples .

To summarize this long introduction, "We", HAVING NOTED USELESS FINANCIAL EXPENDITURE, CANNOT ALLOW SUCH PROCEDURES TO CONTINUE ESPECIALLY WHEN THERE EXIST A VERY WIDE RANGE OF NECESSARY AND USEFUL TECHNICAL PROCEDURES FOR REMEDYING THEM.

It is not sufficient just to note this state-of-affairs, it is not sufficient to cry, we must fight back and cartographic officials are very probably the best-placed persons to make suggestions. In that environment, I am going to

develop my subject and entering a little further into concrete matters, I will attempt to specify :

WHAT NEEDS TO BE DONE ?

HOW TO DO IT ?

WHO MUST DO IT ?

To state **WHAT NEEDS TO BE DONE** is relatively simple. In fact, it is necessary that no development project shall be presented in the first place, then financed and finally launched without an investigation taking place beforehand for specifying the required adapted and sufficient cartography : that would be the guarantee that no unexpected factors arise and cause difficulties during the project-execution phase.

This leads us in the first place to take into account two obligatory phases. The first, at the time of the presentation of the project or request ; the presenters (and the signer) must question themselves as to whether cartography is necessary, if so what type, and if it is mentioned in the presentation document. The second obligatory phase is that which leads to a potential project funding agency to which the request is submitted. Whether that potential funding agency is an international organization (World Bank, UNDP, Regional Banks, etc), or an exterior government for bilateral financing, or even a local technical Ministry, e.g. Planning or Finances with a budget, it is logical that they assure themselves of the quality and utility of that which they envisage financing, i.e. that they undertake a kind of control of the presented project and question the selected inserted cartography.

It is certain that the Project Manager can and must afterwards ask the same question, but at his level, any defect, or any omission noted is often rather complicated to repair. It leads to discussions, to a new study, sometimes to intermediate choices which are not perfectly satisfactory and often to the need for extra finance, impossible or difficult to obtain, and in any case to a loss of time. Consequently, the ideal solution is that the cartography should be selected seriously before the project begins, preferably before the presentation for financing, or at least before the financing decision.

To do what is necessary, one sees, requires a minimum of organization, thought and consultation.

#### HOW TO DO IT ?

At the beginning a development project is initiated by an official commission or a private group in order to meet an agreed requirement or an evolution recognized as necessary. It is often at the level of a Ministry or a government organization that the project is studied. It necessitates the setting-up of a commission comprising the future users, political officials, technicians likely to be involved, amongst others.

It is the initiators and political officials who, at the beginning must set up the ad hoc group or commission and make a wise choice of the participants and it is the latter, often mostly technicians, who will have the responsibility of deciding if cartography is necessary and must define with care and accuracy the "terms of reference" of it. It is evident that this succession of responsibilities needs continuous control and guidance and that one person must be responsible for piloting such a commission and take his turn and in the end be responsible for the final presentation of the project. In more detail, following recent contacts in several countries, the adopted solutions do not vary very much but they must necessarily and always adapt themselves to the local context. It also appears, according to certain rumours, that commissions of this type acquire extremely profitable experience for afterwards operating on similar cases and the setting-up in each country of a **"PERMANENT COMMISSION ON DEVELOPMENT PROJECTS"** is often a very useful initiative.

The investigation currently being undertaken by the A.O.C.R.S., which I presented to you at the commencement, has received other, somewhat different, suggestions sometimes more restraining : they will be the subject of a report after discussion and consideration.

#### WHO MUST DO IT ?

A simple reply could limit itself to saying all those persons closely or remotely concerned by the success of development projects must participate and in any case be anxious to know if everything has been foreseen for their success, in particular the necessary cartography.

In fact, I believe that is not the case, the reason often being that many political, technical and financial officials are only slightly or rarely aware of these problems and in some cases are totally ignorant of them.

It is perhaps that **MAKING PEOPLE AWARE IS THE FIRST BASIC ACTIVITY** and the most important that it is our duty to promote and develop. A beginning in this sense has already appeared and for Africa local organizations, Regional Centres, training colleges and international organizations have often arranged conferences, seminars, 'increased the number of information-days, open-door days, etc. This is excellent but it is insufficient, and I am not sure that those various meetings have reached current decision-makers.

Does one recall having heard that cartography for development was one of the subjects raised in a Government Cabinet meeting, in discussions at one or more Houses of Parliament in any country whatever ? It is certainly useful and profitable over a long period, to take steps now to make schoolchildren, students and university staff aware, but the latter are involved with the future. I personally believe that it is **NECESSARY TO THINK ABOUT THE PRESENT OR AT LEAST THE SHORT-TERM**, if not, we will continue the wastage, reduce the impact of the results of development activities hoped-for and often expected, and continue to make disappear the hopes to which such activities had given rise.

We have made a brief overview of that which must be done, the way it is necessary to do it and who must do it. After that first consideration, suppose that we, all together, have succeeded or that we have succeeded just in a limited geographic zone. In that zone :

- a) Responsible officials have been made aware of the problems involved,
- b) Financing agencies will have received requests for funds and will have agreed to finance cartography adapted to each development project,
- c) Precise texts, or laws or just regulations will have fixed the procedures to be followed so as to guide everyone towards the objective,

- d) Groups will have been set-up for each project in time, or permanently , to plan, fix terms of reference and manage the follow-up,
- e) All development projects will be effective, productive, useful,
- f) etc, etc, ...

Regardless of the degree of success, total or partial, all cartography once produced, must always be up-dated. After the definition and setting-up of the procedures, means and persons for inserting adapted cartography into all development projects, it will be necessary to pay attention to the scientific and human evolution, know how to adapt to them, i.e. up-date, in real time, the fixed rules and especially **MAKE KNOWN WHAT HAS BEEN DONE AND THE RESULTS SO OBTAINED.**

Here, information will be a necessity, a duty, so long as development problems are crucial, worldwide, and affect everywhere, in the present and in the future, the environment in general, and the personal environment of everyone in the world.

It is evident that the **MANAGEMENT** of such mechanisms, in order that they lead to tangible results, will not be easy more especially as the suggestions made may come into conflict on the one hand with other requirements and on the other hand with habits and procedures sometimes originating in the last century and so difficult to forget. The main objective of this communication is to **INFORM THE COMMUNITY CONCERNED WITH DEVELOPMENT PROBLEMS** of the reactions gathered during an investigation for "searching for procedures whereby it will always be possible to insert into development projects the necessary cartography adapted to each project". During that investigation, it appeared that such an insertion is a vital and urgent necessity for all developing countries, so vital and urgent that the question arises as to whether the production of such cartography should be given **TOP PRIORITY.**

The reply requires serious consideration and must begin with a number of known facts.

In the first place, we must note that over several centuries, or at least many decades, cartographers have always hoped to be able to cover their countries with basic cartography, which would evolve in reply to requirements, user-

needs, technical development and the resources at their disposal. It is easy to understand that in order to undertake such operations it was necessary to set-up major organizations with many technicians and experts having had long and varied training. The time required to acquire the hoped-for results was thus very long and they were never really complete because everyone knows that basic and other types of cartography are only useful if they are always up-dated. Consequently, it is accepted that the **NECESSARY FINANCIAL RESOURCES** are **EXTREMELY LARGE** and the reality has shown that such expenditures often exceed governmental possibilities and even those of funding agencies which have increasing difficulty to find money to supply the aids requested, even if they are agreed to be very necessary, urgent and are given high priority .

That race between needs and the resources to meet them is a wager that few countries have succeeded in satisfying, or attaining and often from far away. If today, we can, all of us, consider that we have not attained our objective, we must not lose hope of doing better, and, one day, to achieve our objective.

For the time being, however, we must recognize that the task to be accomplished is immense and important ; it is enough to recall that a few statistics and long studies have proved that the lack of cartography has provoked important losses in the development of the world economy : those losses, even with approximate numbers, correspond to a number 5 times greater than the amount of money required to complete the cartography of the entire world (at least 3 million US Dollars for Africa in 1975). Thus one **CANNOT HOPE TO SUCCEED IN THE NEXT FEW YEARS** and, unfortunately, **IT IS OVER THE SHORT TERM THAT IT IS NECESSARY TO SATISFY THE USERS**. It is perhaps by avoiding the losses of the financial resources now available and by taking all possible actions in order that development projects succeed that a solution will appear.

On the one hand, it is very true that **ADAPTED CARTOGRAPHY**, necessary for carrying-out those development projects, is often more partial more summary, thus **LESS EXPENSIVE** than the regular, complete basic cartography envisaged up till now. On the other hand, up till the present, it was often considered wise, that the only objective to be attained, was to obtain quickly a systematic coverage of an entire country in a **BASIC CARTOGRAPHY** - fixed by senior officials at : 1 : 25 000 , 1 : 50 000 ,

1 : 200 000 or others - without taking into consideration that certain zones did not require such accurate cartography or that the **URGENCY OF THE LATTER COULD BE CONSIDERABLY POSTPONED**.

Finally, I would add , assuming well-organized management of all the operations involved, that it is very conceivable to ensure that always "a cartography for a development project" even if it is partial as regards area or incomplete as regards information, should be planned in such a way that it conforms with the standards used for basic cartography and should always be insertable and be inserted in the short term, as soon as it is produced, into the general schema of that national basic cartography.

In short, the two cartographic objectives are not incompatible ; they can lead towards the same final objective and if undertaken by new dynamic managements, satisfy a greater number of users for the most urgent requirements at reduced costs.

I will limit myself to outlining your considerations in that sense. However, it leads us to a second question. Must institutions ( Institutes , Services , Departments , etc.) planned over many years , based on certain models , for undertaking such operations , be planned in the future in the same way ? Must one always suggest , aid and plan the setting-up of services, of COMPLETE STRUCTURES making it possible for all countries to be TOTALLY RESPONSIBLE for the production and distribution of their cartography and possibly even all their geographic information ? There again the reply cannot be given without serious consideration initiated by a certain number of facts .

Consider , first of all , that in Africa , and elsewhere , the new techniques being employed , even if they open-up new possibilities for obtaining new information in relatively short production-times lead to the use of new equipment , increasingly efficient , but also increasingly expensive. In order to avoid financial losses with that equipment , over recent years , the technicians have been led to not only plan its use for national purposes , but to use it also for regional operations and that has led to the setting-up of regional centres . This is the first blockage , due to the fact that national organizations can no longer be responsible for all operations : that movement is probably irreversible and will only increase .

With that start , is it not necessary , already , to consider how national cartographic organizations might evolve in the long term ? One can , in fact , note that the setting-up of complete organizations of this type often exceed governmental financial possibilities , and require long time-periods for their setting-up which are often incompatible with the fact that they must produce maps rapidly , also requiring



the training of a large number of engineers and technicians , etc, which even if some cases have succeeded , due to exceptional isolated conditions , the government officials , not always well-aware of the importance of cartography , and not very convinced that one day they will be able to overcome all the difficulties linked with similar operations , give up .

For all those reasons , I believe that one must be more realistic and find solutions for planning organizations more rapidly , less dependent on long training , less expensive also , but keeping their effectiveness and especially conserving for each country the possibility to select and also master the development of its own cartography .

In that sense and in the light of a few early experiments , I ask myself , in order to begin , whether it would be wise to limit oneself to "solidly" structuring the organizations responsible in each country to :

- a) Ensure the grouping , conservation and storage of all the cartographic documents ,
- b) Distribute or sell all the geographic information ( maps , aerial photographs , satellite imagery , coordinates , etc.)required by users ,
- c) Draw-up operational programmes ,
- d) Define the national standards to be used ,
- e) Carry out , if necessary , certain pilot programmes ,
- f) Select the production-operators , to ensure the follow-up , and to control it .

Similar STRUCTURES would probably be SIMPLER especially MORE MODEST AS REGARDS BUILDINGS AND PERSONNEL who might be trained more rapidly , IN FINANCIAL RESOURCES required ; they could evolve afterwards and grow if need be when they have proved their effectiveness .Of course , their incidence on the development of the regional centres will need to be considered .

In any case , the agreed or planned budgets so reduced would open up financial availability for operations which in all cases would be very useful .

It is this subject which I submit again to your consideration but beforehand , and briefly , I would like to insist on the financial problem of those suggestions taking into account the

a) Priorities to be defined between cartographic operations for development projects and those for basic cartography ,

b) Advantages , increasingly necessary , for certain thematic mapping operations as well ,

c) Selection to be made between minimum structures more fitted to take action but especially less expensive and the others having the technical resources for all laboratories participating in cartographic production ( from aerial photography to printing and distribution ) .

Such considerations must only lead to decisions after the drafting of a certain number of rules sufficiently precise , to which everyone must conform and which , of course , only become restrictive after the agreement of the political , technical and financial officials concerned .

No one should deduce from these suggestions one (or more ) possibilities of reducing resources , particularly financial ones , set-aside till now for undertaking "real cartography" -we know that world wide it is in deficit - but perhaps only whilst waiting for officials in all countries to become aware of these problems , a reduction in useless expenditure , the taking into account of certain more urgent matters , even more , the transition from excellent dreams always delayed till later when they become crucial , urgent for cartography , and consequently for development which in numerous cases although less conspicuous are real humanitarian actions and as important as them .

I hope I haven't been too long , but I would be pleased if , by this single talk , I have been able to convince you and provide you with some topics to convince others . The absence of cartography is not the only reason for the failure of development projects , but it is a domain where we can take action , and attempt to bring our knowledge to the common edifice .

IN CONCLUSION we should remember that :

a) The absence of cartography adapted to development projects is a cause of failure and a considerable loss of finance which could be used elsewhere .

b) That "adapted" cartography is not incompatible with basic cartography but it is often more urgent ,

c) For remedying it , the making aware of all the technical, political and financial officials is basically necessary ; it must be continuously renewed .

d) Well-defined priorities and modifications in the current procedures concerning , in particular , structures must be the subject of common consideration

e) One must not limit oneself to emitting pious resolutions but obtain decisions applicable to all the highest levels .

I will close by saying how much the investigation , mentioned at the beginning and in which I participated , opened my horizons . It has renewed my confidence and I hope that I have today been able to share with you that revival of opportunism which I was able to derive from it .

Thank you