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THE ATLAS OF MADAGASCAR 1/

Submitted by the Government of Madagascar

A. PRESENTATION OF THE FIRST PART

In 1969, the Association des Géographes de Madagascar produced the first part of the Atlas of Madagascar, in addition to the two annual issues of Madagascar, "Revue de Géographie". Contrary to the original plan, whereby publication was to be in five annual parts each comprising 10 or 12 plates, this first section contains 31 maps (four of them in two plates) and 31 explanatory notes, making up more than half of a document which is scheduled for completion in 1971. This achievement is the culmination of several years' work and close collaboration between forty or so specialists. 2/

Background

The idea of a Malagasy national Atlas was first conceived in the Geography Laboratory of the University of Tananarive in 1964. Despite the magnitude of the undertaking at this time no comparable work existed and almost all the

- 1/ This report was prepared by Mr. Paul Le Bourdier, Assistant Head of Geography at the Faculty of Arts and Social Sciences, University of Madagascar.
- 2/ The production of the Atlas of Madagascar was made possible only by the generosity and goodwill of many individuals. On behalf of the Association des Géographes de Madagascar, we should like to express our thanks in particular to the Rector and the members of the Council of the University of Madagascar, the Directors-General of the Centre National de la Recherche Scientifique of the Office de la Recherche Scientifique et Technique Outre-Mer, the Bureau pour le Développement de la Production Agricole (BDPA) and of the Institut National Géographique, Paris; and also to Mr. Delorme and the staff of the BDPA Agency in Madagascar, and to Mr. Sallat and the technicians of the IGN Centre, Tananarive, without whom we should have been unable to overcome the many difficulties encountered in the course of this work.

necessary documentation had to be assembled before passing on to the graphic (design stage), and despite the shortage of staff and the total uncertainty with regard to financial resources, the small team set to work. Led by Françoise and Paul Le Bourdieu, it undertook its first research under the direction of Professor René Battistini, producing its first models in 1965. At this time, the plan was to produce a large format atlas (42 x 45 cm), containing about fifty plates, a number of which would be on the scale of 1:2,000,000. The expense which would be involved in producing such a work, however, coupled with the almost total lack of funds, caused the project to be temporarily dropped.

In fact, the project was only partially abandoned. Assisted by a technical co-worker placed at the disposal of the laboratory by the Centre National de la Recherche Scientifique, the geographers at the University continued doggedly with their documentation and the work of preparing the models. As a result, a dozen plates were ready for printing by June 1967, and ten more had already been prepared. Although the preparatory work continued, it was still necessary to wait for more favourable conditions for publication. A few months later, the Minister of State in charge of Agriculture, Rural Development and Food Supply asked the University and the Bureau pour le Developpement de la Production Agricole (BDPA) to produce a series of thematic maps to illustrate the documents relating to the "Grandes Opérations Agricoles" 1/ (Major Agricultural Schemes) being envisaged as part of the development plan. With this task successfully accomplished, the geographers and specialists of the BDPA worked together to find a means of publishing the work already carried out for the Atlas of Madagascar and, more especially, the maps having some significance for agricultural production (climatic maps in particular). It was then decided to reduce the models already assembled to a smaller scale and to reduce the format of the plates to 40 x 31.5 cm.

It then remained to be seen whether this smaller format could be used for the Atlas as a whole. After thorough examination of the question it became clear that this modification of the original plan could be contemplated only if the number of plates was increased. This increase, in the number of plates however, did, offer the advantage of enabling the number of colours per map to be appreciably reduced; in addition, the smaller format would make the Atlas less costly and more manageable.

It was on these bases, which were substantially different from those of the original project, that a new estimate was made. It was to prove much less costly, and received the support of the CNRS 2/ and of ORSTOM, each of which provided a sizeable grant. The Association des Géographes de Madagascar decided, for its part, to devote its own resources to the project. In addition, the University of Madagascar undertook to provide a very considerable portion of the financing at exactly the same time as the Office of the Vice-President of the Government of Madagascar and the French Embassy at Tananarive were offering encouragement to the authors of the project in the form of advance subscriptions. The production of the Atlas was becoming more feasible.

1/ Malagasy Republic "Les Grandes Opérations" Programme 1968-1969, 2 volumes, BDPA, Tananarive, 1967.

2/ See list of abbreviations at end of document.

In the meantime, another essential stage had been accomplished with the establishment of a drafting committee comprising University geographers and specialists of the highest calibre. They included two archeologists, a historian, an ethnologist, two geologists, a botanist, two pedologists, two hydrologists, two geophysicists and the whole of the geographical section of CRSTOM. Once the contract relating to the physical production of the Atlas (printing, binding) had been signed, the drafting committee was to receive additional help from the BDPA specialists, and from the professional geography staff and cartographic artists of the IGN.

#### General characteristics of the Atlas

The Atlas of Madagascar, to be produced jointly by the BDPA agency in Madagascar and the IGN Centre at Tananarive, will contain 60 plates (9 of them two-page and 60 exploratory notes, in a screwpost binding the green plastic will bear the title "Atlas of Madagascar" in gold-tooled capital letters. The format will be 32 x 42 cm. The plates are arranged under seven headings. The use of this format (31.5 x 40 cm) made it possible to give a full-page presentation of Madagascar on the scale of 1:4,000,000. This scale has in fact been used for all the plates, except the monthly climatic maps and three other themes (plate 6: cartography, "State of advancement of IGN work as at 1 January 1969"; plates 20 and 20a: "Major steps towards political unity"; and plate 58: "Religions and Missions", for which it was decided to juxtapose 4 or 6 1:10,000,000 maps on each page. The town plans (plates 27 and 27a) and the types of agricultural area (plates 39 and 39a) also constitute special cases. All the other maps are presented in exactly the same format, to allow for superimposition of the transparent base reference map showing the location of all the communes on the island.

Apart from this rhodoid-based map, all the plates in the Atlas are printed on 180 gr. paper, and the number of colours varies from 2 to 10.

The notes accompanying each plate are printed on 90 gr. paper, and are presented according to a uniform layout giving the sources used, the methods used in preparing the map and a commentary intended not only to facilitate reading of the map, but also to provide additional information. It is for this reason that the authors have frequently included statistical graphs, charts or tables in their texts.

Among the end papers, the reader will find an inset map showing the geographical position of Madagascar and the neighbouring countries, together with a preface by His Excellency Mr. Philibert TSIRANANA, President of the Malagasy Republic, and President of the National Foundation for Higher Education, and an introduction signed by Mr. Laurent Botokeky, Minister for Cultural Affairs.

#### Content of the first part

As stated in the opening of this paper, the Atlas of Madagascar was to be produced in two parts: the first, containing 31 maps, will appear in 1969, and the second, containing the last 29 plates, in 1971.

It should be clearly understood that the way in which the maps are distributed between the two parts depends entirely on the state of advancement of the work as at 1 July 1969.

Like the work as a whole, this first part contains some plates which are entirely new and others which consist of existing documents updated or adapted to the spirit and format of the Atlas.

Using these documents, it has been possible to almost complete the "Natural Environment" section; only plates 13 (Precipitation/temperature diagrams) and 15 (Hydrology) are now missing. The reader will observe that plates 2 "Relief and Bathymetry", 3 "Geology" and 16 "Pedology" were produced by the IGN Centre at Madagascar. The other maps were produced by the BDPA. Using the reference map with its removable transparent base, and of a directory of place names, the reader can locate on any map all the urban and rural communes in Madagascar, and, simply by reading, can obtain the maximum of information for a given place.

For reasons of documentation, the other chapters are at a less advanced stage. They will in effect contain a large number of maps constituting first attempts at graphical representation of such themes as "Archeological and Palaeontological sites" (19), and the "Regional Divisions of Madagascar" (59). Nevertheless, in the first section, readers will find numerous data on human geography (population density by cantons, urban active population, demography, expatriates in Madagascar), rural economics (use of cultivated land, rice, fibres, cattle farming and trade), industrial resources and activities (mineral deposits, power, location of industries), communications (road vehicles), and the various infrastructures and services (health infrastructure and banking organization).

In conclusion, it should be pointed out that all the work of documenting and planning the Atlas was completely voluntary. Consequently, the costs of the complete volume will amount to only 10,000 Malagasy francs. The Council of the University of Madagascar, anxious to promote the dissemination of the Atlas, has further lowered this figure by reducing the issue price to 7,500 Malagasy francs during the subscription period. The Association des Géographes de Madagascar intends to use the revenues from this subscription to complete the Atlas, the first section of which was produced largely through grants from the University, ORSTOM and CNRS.

#### B. PRESENTATION OF THE SECOND PART

During the second half of 1971, the subscribers to the Atlas of Madagascar received the second part of the work. This part had been announced in 1969, the date of the publication of the first part. The new set of documents, which is practically identical in volume to the first part, marks the culmination of two years of work. The need for such an Atlas was becoming increasingly felt, as no work of this kind had existed previously in Madagascar. Thus, in less than four years, the Association des Géographes de Madagascar has not only produced the first National Atlas of Madagascar, but has provided the "Grande Ile" with a working instrument which many tropical countries still do not have.

Conditions under which the second part was produced

The first part of the Atlas, which was produced by the voluntary work of a team of almost 40 teachers and research workers, was printed using the grants from the University of Madagascar, the Office de la Recherche Scientifique et Technique d'Outre-Mer, the Centre National de la Recherche Scientifique, and the Association des Géographes de Madagascar.

Once these grants were exhausted, the various collaborators could count only on revenues from subscriptions to finance the completion of their work. The dissemination of the first part (1,500 copies sold out in less than two years) not only provided those engaged in this work the means of continuing, but also offered considerable encouragement to the team as a whole. Paradoxically, as a result of this, many of the early subscribers (by these are meant the hundreds of individuals who had demonstrated confidence in the work by subscribing early in the subscription period) and many users of the Atlas felt momentarily that their confidence would be poorly rewarded. In fact, the second part had been announced for the end of 1970, a year after the appearance of the first plates. Was this over-optimistic? We do not believe so. Finding themselves in a few months with financial resources which, just a short time before, had been unexpected, the authors of the last plates wished to make some improvements. It was no longer possible to consider changing the scale of the maps, or to deal with new themes not included on the list of documents announced. A number of maps, however, were re-designed and printed in one or two additional colours, which made them easier to read and substantially improved their presentation. At the request of the Director-General of BDPA, plate 34, which had already been printed, was made into two plates so as to show more clearly the different areas of agricultural production (sugar-cane, tobacco, cloves, pepper, vanilla, ylang-ylang and lima-beans). The IGN Centre in Madagascar, for its part, gave very special attention to the production of the 7 town plans, thereby partially responding to the wishes of subscribers who wanted the inclusion of more detailed maps in the national atlas. In addition, a further grant from ORSTOM enabled the team responsible for carrying out the study of Regional Divisions to add a new map in 8 colours (Plate 59B) to the monochrome plate already produced (59A); the Drafting Committee thus was able to respond to the request of the Ministry of Planning of the Malagasy Republic, which wished to have working bases containing as much detail as possible. Also, a number of authors, wishing to publish up-to-date documents, embarked on revisions of their maps or additions to their texts; in this way, the plate "Secondary and Higher Public Education" previously prepared from data valid in 1968, was recomposed so as to take account of the progress made by Madagascar in the area of school attendance.

The second part of the Atlas, like the first, deals therefore with 29 themes in the fields of physical, human or economic geography, communications, various infrastructures and regional geography. It actually includes 34 plates (instead of the 29 maps planned), and a number of explanatory notes containing between four and six pages (instead of 2 or 4 as in the first part of the work) <sup>1/</sup>.

<sup>1/</sup> Unfortunately, it was not possible to distribute the Atlas in instalments. The second part could not therefore be distributed until the completion of the final document, all the others having been printed already. We apologize to subscribers for any inconvenience that this may have caused.

Content of the second part

The first part of the Atlas (1969) is now supplemented by the following documents (generally on the scale 1:4,000,000):

- Plate 14 - Precipitation/temperature diagrams showing the length of the dry season, and emphasizing the contrast between areas which are watered throughout the year and regions in which the soil is subject to seasonal water shortages. In his commentary, the author of the explanatory notes (R. Dufournet) gives sets of particularly significant data;
- Plate 15 - Hydrology, prepared by M. Aldegheri (assisted by B. Billon) on the basis of work done by ORSTOM, shows the major divisions in the hydrography, together with the hydrological characteristics of the 18 major river basins in Madagascar;
- Plate 18 - History of the Geography of Madagascar: routes taken by travellers prior to 1900 referenced by P. Verin and C. Mantaux, with the collaboration of the Association malgache d'Archéologie. This map, the only one of its kind in Madagascar, is accompanied by 6 pages of text and references to early authors;
- Plate 19 - Archeological sites: classification and location of sites (studied before 1970) prepared by P. Verin and R. Battistini;
- Plate 21 - Ethnic groups: the 19 groups making up the population of Madagascar. The author (J. Poirier), by using different colours, shows the principal areas of recent or current immigration;
- Plate 23 - Point representation of population distribution: an adaptation on the scale 1:4,000,000, and updating (to 1968) by F. Le Bourdieu, T. Rabenja and P. Le Bourdieu of the 1:1,000,000 map established by Professor P. Gourou (on the basis of the populations from 1955 to 1958).
- Plate 25 - Urban population and rural population in 1968. Circles in proportion to the populations of centres with more than 2,500 inhabitants, and rural densities represented by areas of different colours supplement plate 24 "Population density by canton and km<sup>2</sup>", established by the same authors (F. Le Bourdieu and T. Rabenja) in 1966.
- Plates 27 and 27a - Town plans: a double plate juxtaposing for the first time at the same scale (1:50,000) the plans of Tananarive (Plate 27a) and those of the six other major towns (Tamatave, Majunga, Finarantsoa, Diego-Suarez, Tulear and Antsirabe).
- Plate 30 - Internal migrations: 4 maps on the scale 1:10,000,000 established by J. P. Raison, showing the dispersion of the main groups of migrants across the island, together with the directions of migration;
- Plate 33 - Coffee, cocoa, bananas: the authors (P. Le Bourdieu and M. Petit) show the areas of production and the importance of these three commodities in Madagascar's foreign trade;

- Plate 34 - Sugar-cane, pepper, vanilla, ylang-ylang: and plate 34a - Cloves, tobacco, lima beans: Representation on two sheets for greater clarity. The South-west Coast (for lima beans) and Nossi-Be Island are shown in detailed marginal insets;
- Plate 36 - Oilseeds: A summation of knowledge of the ground-nut, the coconut palm, the oil palm, cottonseed, aleurite, castor oil seed and industrial oilworks, prepared by M. Delorme (IRHO) and P. Le Bourdieu.
- Plate 38 - Other animal resources: Dealing with fisheries, and pig, sheep and goat farming, this map, established by M. Delenne, complements sheet 37 "Cattle farming and trade" published with the first part of the Atlas;
- Plates 39 and 39a - Types of farming area: Land use patterns in 3 coastal villages and 3 highland villages studied by the Geography Unit of the ORSTOM Centre at Tananarive. The scales used are 1:10,000 and 1:20,000;
- Plate 42 - Hydrocarbons: Refining of crude petroleum imported at Tamatave, and regional redistribution of the refined products (study by F. Le Bourdieu, T. Rabenja and V. RAJAONAH).
- Plate 44 - Logging operations and re-forestation areas: The author (G. Mottet) also deals with existing or planned forest industries. The re-forestation areas of Haute Matsiatra (Fianarantsoa) are shown in an inset on the scale 1:750,000;
- Plate 45 - Road and rail infrastructure: An adaptation to the Atlas scale of the Institut National Géographique 1:2,000,000 map, accompanied by a description of the major construction projects which have been recently completed, are in progress or planned;
- Plate 47 - Road traffic: A cartographic representation by F. Le Bourdieu of the enumerations carried out in 1967;
- Plate 48 - Rail traffic: established by M. Bied-Charreton. "A clear difference is shown in the amounts of traffic on the "up" and "down" tracks of the Tananarive-Tamatave line, an indication of foreign trade. East Coast and Fianarantsoa - East Coast lines accompanied the document on the traffic proper is accompanied by illustrations of the vertical alignments of the Tananarive - East Coast and Fianarantsoa - East Coast lines;
- Plate 49 - Aviation infrastructure: Because of the remarkable density of aerodromes in Madagascar, the author (P. Le Bourdieu) has classified them by means of circles of different sizes and colours. The map is accompanied by a report on navigational aid facilities;
- Plate 50 - Commercial aviation network: Six maps on the scale 1:10,000,000 established by P. Le Bourdieu to represent the air services for each day of the week during the 1970-1971 southern hemisphere summer. The use of different colours makes it possible to distinguish the types of aircraft operating the various services;

- Plate 51 - Passenger air traffic, complemented by the 1969 data on the volume of freight and the frequency of use of the aerodromes (study by M. F. Perrin and T. Rabenja);
- Plate 52 - Port traffic: distinguishing not only between imports and exports, but also between long-sea and coastwise shipping. The authors (F. Le Bourdier and T. Rabenja) also propose a classification of ports;
- Plate 53 - Telecommunications network: carried out by the same authors as the preceding map. It comprises a table of the domestic infrastructure, a report and a map of international links;
- Plate 54 - Secondary and higher public education: The authors, (J. P. Domenichini and P. Le Bourdier) wished to make this map not only an up to date picture of the situation in 1971, but also a document which can reflect developments in this field, the size of the symbols showing the location of the secondary schools, signifies the level of studies to which the students will be able to proceed from year to year, until the institution of the full secondary curriculum);
- Plate 57 - Hotel and tourism facilities: An original study by P. Le Bourdier and Y. Lageat giving not only roads, hotels and sporting facilities, but also a classification of the main tourist attractions;
- Plate 58 - Religions and missions: In addition to giving the percentages of the population made up of Christians, Moslems and those who have continued to adhere to the traditional religions, the authors (A. Dequin and J. P. Domenichini) also include a table showing sectarian secondary education, which partially complements plate 54;
- Plates 59A and 59B - Regional divisions: this is a team effort constituting the first attempt to depict the regional structure of Madagascar. Each of the two maps is accompanied by an index of the regional units; these indexes moreover complement one another, with one (59A) being mainly analytical and the other (59B) of a more general nature;
- Plates 60 and 60a - Development areas: achievements and plans. This consists of a general map on the scale 1:4,000,000; on the facing page, three sketches on the scale 1:25,000 by G. Coquet and G. Dandoy show the Bas-Mangaky, Moyen-Ouest and Lake Alaotra development schemes.

#### Observations - Future outlook

The second part of the Atlas of Madagascar, as can be seen, differs in a number of respects from the first part published in 1969.

In addition to the few slight changes in the general presentation already mentioned, users will note a greater preponderance of maps dealing with human and economic problems. There are two reasons for this. First it should be pointed out that, in producing the first part, the Drafting Committee had been able to draw on a number of earlier publications, which were the results of long-standing research in Madagascar, in particular in the field of earth sciences

(geology, pedology, tectonics, gravimetry and magnetism, climatology, geomorphology, etc.); consequently, it was possible to give the "Physical Geography" section extensive coverage in a comparatively short time. The section on human and economic geography, on the other hand, required a vast quantity of additional documentation and numerous field surveys; the result was beneficial, since the sheets corresponding to these topics are based on very recent data and are therefore likely to prove very useful (the physical maps are comparatively less susceptible to obsolescence).

Naturally, this work, which is the first of its kind in Madagascar and was planned and executed under somewhat rudimentary conditions, cannot claim to be of the same quality as many of the atlases produced in the industrialized countries of Europe or North America. Nor does it claim to be comprehensive; there are many topics which could have been dealt with but which, for various reasons, had to be excluded (fauna, types of dwelling and storage systems, regional dialects, distribution of endemic diseases, etc.). But at least, it does exist, until such time as a second, more complete edition is undertaken; such an edition is currently being planned, together with a series of regional atlases.

An atlas must also be an evolving work. The screw-post binding system has been designed to allow for the replacement of any documents updated, before the production of a new edition, totally different in its conception and its content. At present, a number of sheets are undergoing revision. Such rapid progress has been made in fibre production, and particularly in cotton production in the North-west, for example, that map 35, published in the first series, is already obsolete and must be re-printed. Others will follow. Only staffing and organizational problems might delay the distribution of these documents, which could quickly increase in number, as a result not only of the demographic and economic development of Madagascar, but also of the growth in the knowledge of researchers, for whom the entire national territory constitutes a veritable laboratory.

Nevertheless, in its present state, the Atlas as a whole constitutes a coherent collection, a complete working instrument, which can, in time be added to the already rich stock of work on Madagascar <sup>1/</sup>. Apart from meeting the needs (as is shown by the list of 1500 subscribers) of Government departments, commercial and industrial circles and numerous private individuals who simply wished to learn more about the "Grande Ile", the Atlas of Madagascar constitutes one of the best ways of ensuring the success of the legitimate campaign now being waged to adapt the teaching of geography to correspond with the actual conditions in the country. The authors, both French and Malagasy, wished their work to be an example of international co-operation; at the same time, they worked for better integration of the University (in the broadest sense of the term) into its environment.

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<sup>1/</sup> At the time of writing, an additional 500 copies of the Atlas of Madagascar are being printed to meet the requests still coming into the Laboratoire de Géographie. Although there have been some changes made (quality of paper, shades of colour) and a few corrections of detail (elimination of errata), this does not constitute a second edition.

For further information about the Atlas, write to:

M. le Secrétaire Général du Comité de Rédaction  
de l'Atlas de Madagascar  
Laboratoire de Géographie  
B. P. 907 - TANANARIVE - Madagascar

List of Abbreviations used:

BDPA: Bureau pour le développement de la production agricole;  
CNRS: Centre national de la recherche scientifique;  
IGN Centre: Centre de l'Institut géographique national à Madagascar;  
ORSTOM: Office de la recherche scientifique et technique d'outre-Mer.