

A Regional Development Plan for West-Suriname

Final Thesis for the Diploma in 'Stedebouwkunde' at the Technische Hogeschool, Delft, The Netherlands in 1979, by Basil N. Brink.

Mentors

- | | |
|------------------------|---|
| Prof Dr P. Drewe | - Co-ordinating Mentor as well as Mentor for
'Stedebouwkundige Planologisch Onderzoek' |
| Ir B. Bach | - 'Verkeerskunde' |
| Drs R. Moens-Gigengack | - 'Landschapskunde' |
| Drs R. Walter | - 'Stedebouwkundig Ontwerpen' |

My thanks to every one who has helped me by providing information or their advice. Especial thanks to my mentors in this regard.

My appreciation to my wife Elsabé, who did the typing and helped to edit this thesis.

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NOTE: A second report - THE APPENDIX REPORT accompanies the main report.

Preface

The author of this report first came into contact with the problems surrounding the development of West-Suriname in March, 1978, when he became a member of the I.S.P. West-Suriname. The latter was an inter-university as well as inter-disciplinary planning study group based at the Technische Hogeschool of Delft. This group studied regional development of West-Suriname, arriving at their own proposed regional plan after a full-time study period of seven months.

Even before completion of the I.S.P work, the author decided to continue with this subject of study as a final thesis for the diploma in Town Planning (Stedebouwkunde) as he had become interested and immersed in the problems pertaining to the planning of regional development.

The report which follows (as well as its accompanying Appendix Report) is intended to have at least three functions:

- 1) Serve as final thesis in the framework of academic requirements.
- 2) Provide alternative ideas for the development of West-Suriname.
- 3) Engage a new, wider field of readers in the problems of Suriname/West-Suriname. This last function is made possible by the fact that the report is written in English (not Dutch, as is the case with practically all previous publications on this subject) which means that English speaking persons interested in Suriname/West-Suriname who cannot read Dutch are enabled to become acquainted with the problems/proposals outlined in this report.

Main sources for this thesis were the I.S.P. West-Suriname's four reports - a main, background study, inventarisatie and a group-work evaluation report. The nine participants in this I.S.P. (inter-university study group of planning) included students of building technology, polder design, water control, sociology of development, traffic/transport, social planning and urban/regional planning (me).

My work on the present regional planning study was started in November 1978. It was decided to attempt a fresh, more comprehensive study of the 'Stereotypen Onderzoek', being the analysis of spatial settlement patterns and corresponding development strategies, (Phase 3&4 - Development Models). Relevant up to date books were read and summarised to inform the Development Model analysis. The results of this literature study (albeit much shortened) are included in Phase 3&4 and the Appendix Report.

Discussion with knowledgeable persons in the Netherlands e.g. a debate on West-Suriname at the Erasmus University, Rotterdam, with Drs H. Chin as speaker; discussion with Mr H. Rodgers of the Netherlands Economic Institute on re-migration from Holland to West-Suriname, were also used in the Problem Brief.

Although I have never been to Suriname, (as was the case with 6 of the 9 I.S.P. fellow students who went there in June/July, 1978) the country, life style, climate etc., have been made clear to me by the fact that:

- two students in the I.S.P. group with whom I worked full time were Surinamese.
- I personally interviewed/spoke to many Surinamese in the Netherlands.
- The many slides and photos of Suriname/West-Suriname taken by the six 'travellers' made the picture complete.

Whereas planning/working with cultivated inhabited regions is a relatively easy task, planning/working in a practically uninhabited tropical frontier region may be said to be fraught with uncertainties and hazards.

Reasons for these difficulties include:

- Lack of information (maps, contours) about the region itself.
- A scarcity of impact studies in tropical regions, as regards not only the environment (rain forest, soil structure, savanna-formations) but also agriculture (mixed crops vs. mono-culture, small scale vs. large scale, erosion) and bauxite mining (laterite crust formation, mining excavation holes).
- Lack of an existing (be they mobile or immobile) rural population i.e. 'pioneer' migrants must be attracted to the region to develop it as desired/required.

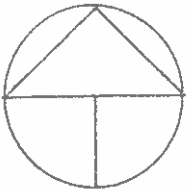
A possible reason for the above lack of 'hard' facts on impact/effect, is that to date not much 'modern' human activity has taken place in these regions - they have remained the same for thousands of years, being almost totally uninhabited and unexplored. Only of late has interest/activity grown in such regions e.g. in Brazil with its Trans-Amazonian Highway which is being constructed at present to the south of Suriname, and generally with negative ecological effects - see Leentvaar (1974) on the Brokopondo Dam, Phase 1.1, and Goodland & Irwin in Appendix Report.

In conclusion, the work process was characterised by frequent discussion with my four permanent mentors, either individually or as a group.

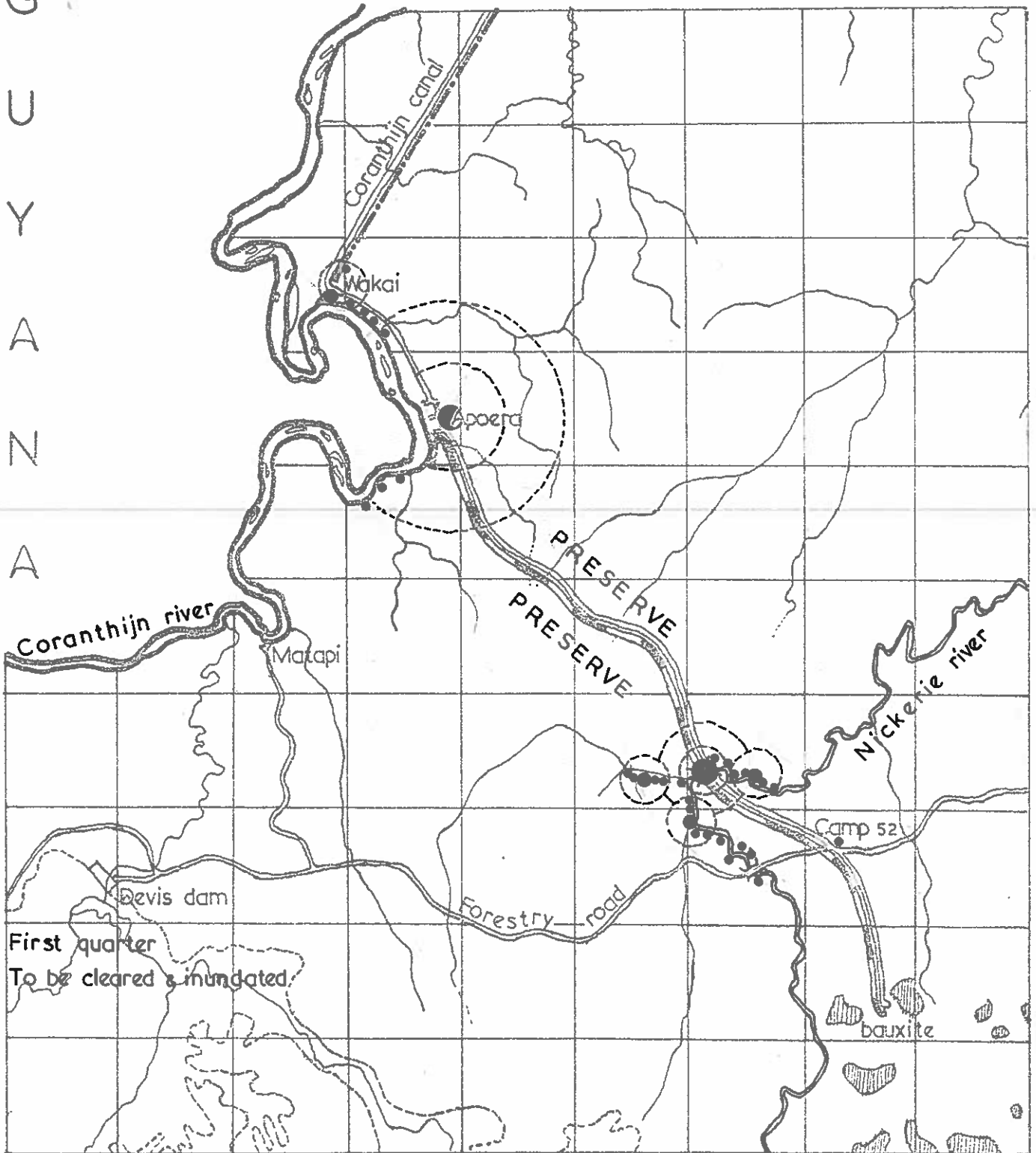
Various comments and criticisms were levelled at me during these discussions, which were invaluable in improving and structuring this thesis.

WEST SURINAME

THE PROPOSED REGIONAL PLAN



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PART ONE ~

WORK

PROCESS

□ Planning as a Process of Strategic Choice

At the outset of the planning task it was decided to select a suitable planning process to structure/clarify the to be followed work proceedings. The broad line of the strategic choice process was selected although it should be noted that it does not differ to a great extent from other planning processes. It is inherently cyclical and incorporates relatively new techniques to improve decision making - the analysis of inter-connected decision areas and the management of uncertainties. The latter methods were not comprehensively applied in the present work process, but aspects of these methods were used. This also because AIDA and the management of uncertainties were initially generated for extremely detailed planning, e.g. location of a school; whereas the burden of this thesis is regional planning, and thus less detailed than urban planning. In one of their first publications on strategic choice, a planning process developed at the 'Institute of Operational Research', Friend and Jessop (1969) define the term as follows:

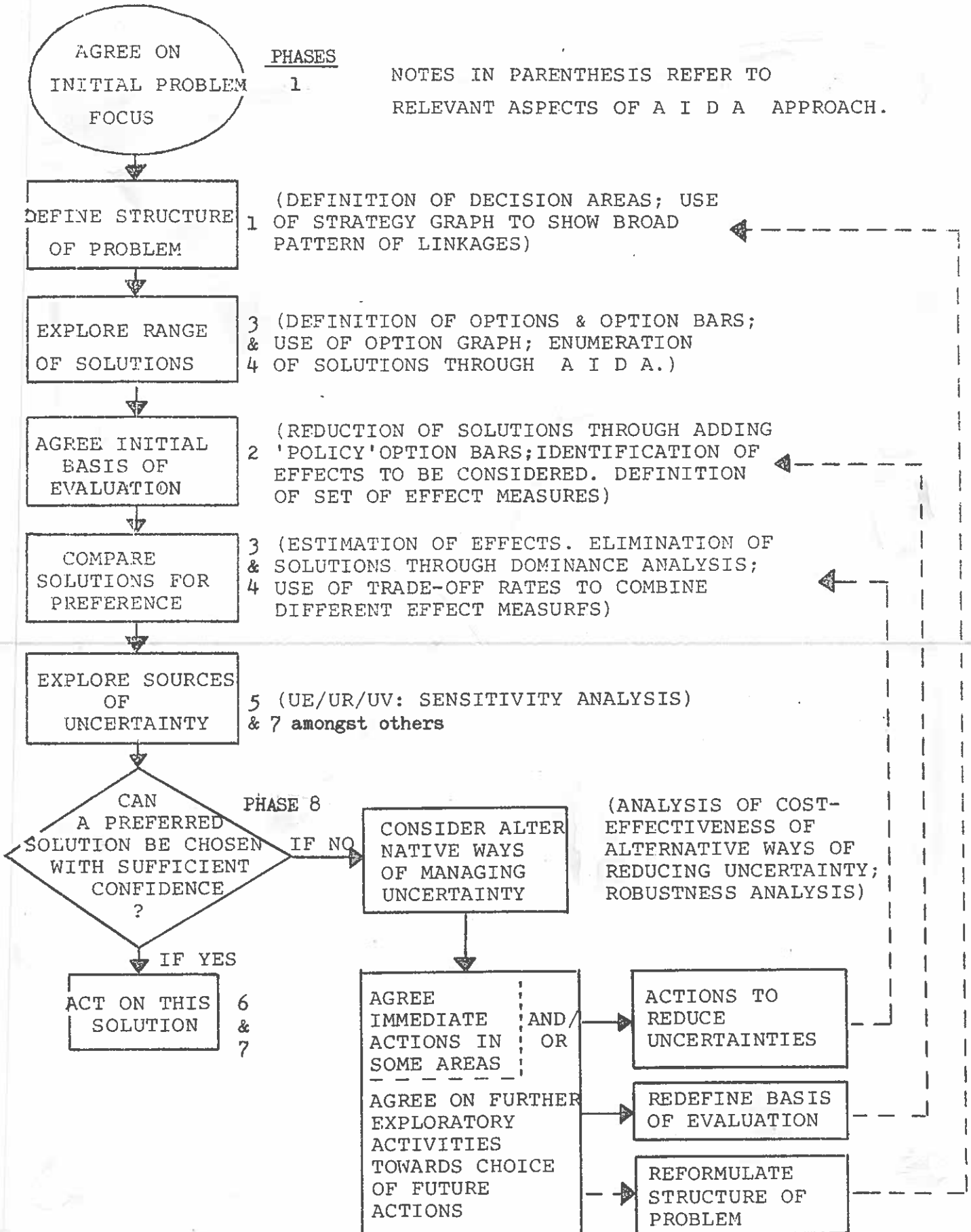
"The view of planning which emergesis that of a process of decision-making under uncertainty, in that choices are repeatedly made between alternative courses of action with only an inadequate picture of their future implications..... We suggest, as a working definition the somewhat more concise alternative of 'planning as a process of strategic choice. The word 'choice' is here used to embrace all areas of discretion, whether they imply the formal commitment of a decision. The word 'process' is used to suggest the property of continuity over time; and the word 'strategic' is inserted to give at least a hint that we are dealing with a level of choice where difficult challenges are likely to arise from the various classes of uncertainty we have now identified, and where corresponding stresses are likely to develop within the decision-making system".

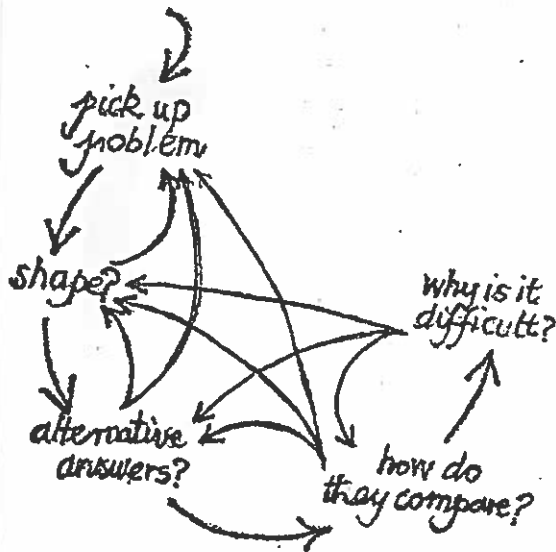
Friend (1977) schematizes and describes the process of strategic choice as follows:

"...the strategic choice approach seeks to provide for the extension of the technology of planning towards the continuous review and reformulation of problems and their relationships, coupled with the systematic consideration of what to do in terms of proposals at any particular juncture.

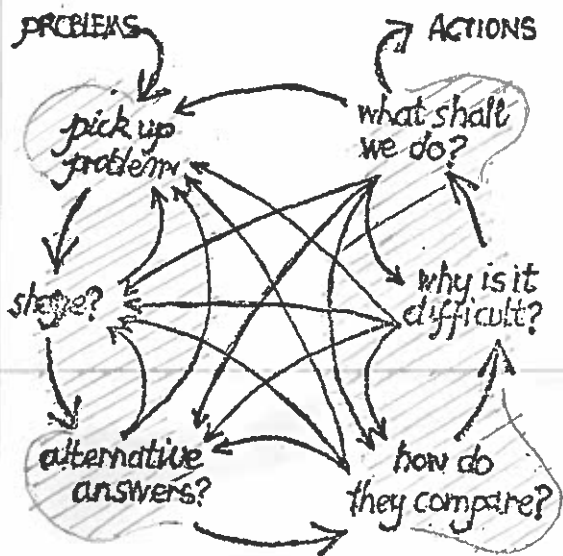
The key to an extension of planning technology into the first areas lies, as indicated by the shading in (the following) figure, in the systematic structuring of problems through analysing areas of choice and the linkages between them (Analysis of Inter-connected Decision Areas = AIDA), while the key to the second lies in the systematic consideration of how to manage uncertainties".

Planning as a Process of Strategic Choice





The next question we ask is what are the alternative answers to that problem? And when we have had a look at some of the alternative answers, we are almost certain to find that we have got the wrong shape, or even that we have still got the wrong problem. In which case we go back and put it into better shape. Then, as soon as we have got things reasonably right, it is time to move on again and we ask what are the consequences of these answers - and how do they compare? And then why is it so difficult? And of course these questions in turn will tend to pose questions about what we had before, and frequently may make us want to change it; in which case, we do. It is most important to understand that recycling is desirable, and is possible from any point in the process back into any earlier point.



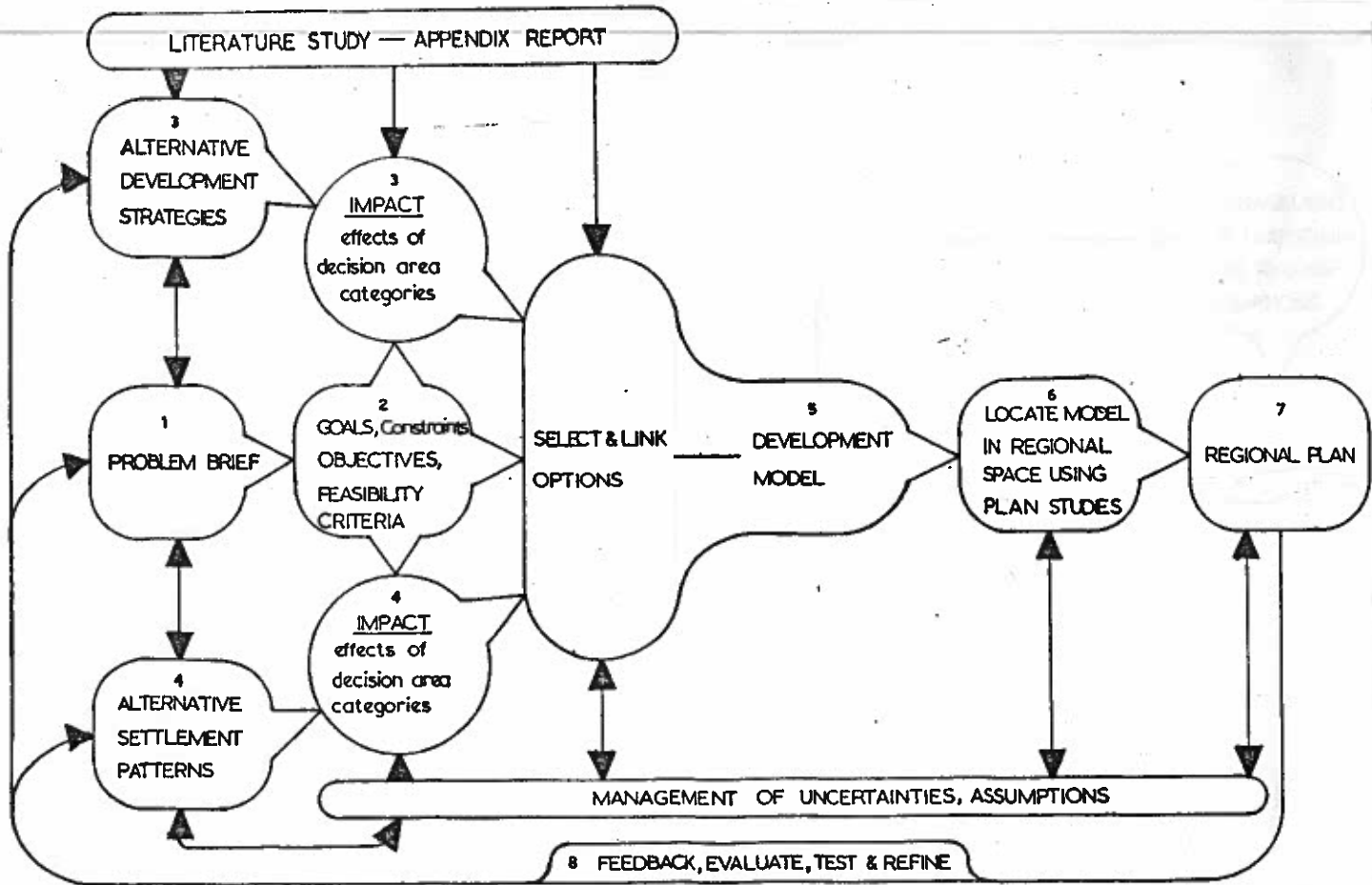
Eventually, we come to a point where it is important to think about arriving at decisions, and we ask what shall we do then? If we have got the timing right, our first look at this question will do much to inform the earlier formulation of the problem, and we will have time to go back and do it again. Hopefully, some actions can be safely recommended - remembering that it is not necessary to have the answer to everything because the remainder can be recycled for further review and analysis. Going backwards can be a creative thing. Finally, on this question of a cyclic process - if you recognise it as something you have been doing all along, but have been a little bit ashamed of because it is not the rational scientific thing to do, then relax, do it explicitly, because this is one of the ways to better planning."

The planning process is a cyclic one - this allows the planner to accommodate the incrementality of his decision making, when he either has an information overload or too little information at a particular point in time. Hickling (1974) says: "Going round in circles can be very productive. Going forwards before all the loose ends are tied up, and going backwards before moving again, are essential processes".

Hickling's description of the process of strategic choice is taken up above. It is interesting to note the similarity between his final diagram and that of Friend (1977). The cyclic process that Hickling describes has been followed to generate the regional plan as presented in Phase 7. In overview the various phases described by Hickling are translated as follows in the present regional planning process, which has been schematized on the following page.

Pickup Problem	= Problem brief:Description of Existing Conditions in Suriname. Phase 1
Shape of Problem, Focus	= Constraints to Development at international, national and regional level. Phase 2
Alternative Answers?	= The analysis of a Regional Development Model = alternative strategies + alternative settlement patterns. Phase 3 & 4
How do they compare?	= Effects/Requirements of each alternative → unfavourable consequences and impact. Phase 5
Why is it difficult?	= Identify and manage uncertainties. All phases
What shall we do?	= The course to be taken when developing the region → the regional plan. Phase 7 & 8

The present regional planning process has therefore largely followed that of Strategic Choice, with the exception that specific methods which are thought to be suitable in the Third World context have been selected and applied. The following diagram indicates the main phases which make up the present regional planning process.



WORK/REGIONAL PLANNING PROCESS

b Planning Methods

To arrive at an alternative regional plan in such a way that the process is clear and rational, requires the selection and use of existing or to-be-formulated planning methods. This clarity of planning process is necessary for, amongst others, the following reasons:

- The process lies exposed to the planner himself and all who may be affected by the plan. In this way thinking mistakes and incorrect decisions may be pin-pointed, rooted out and the planning regarded afresh.
- Many decisions taken by the planner are political in nature; consequently they should be made known to the target groups of the plan to ensure democratic decision-taking.
- The evaluation of the suitability of planning methods applied, for future use in similar or differing planning contexts.

The Analysis of a Development Model

The strength of this method is that both alternative development strategies as well as alternative settlement patterns may be evaluated in terms of their feasibility for development at different levels of aggregation with regard to factual input. It is possible to complete the analysis at a level which corresponds to the amount of information the planner has at his disposal at a particular moment. Should the information become more detailed/comprehensive, the Development Model may (once more) be analysed and evaluated hopefully with a much more appropriate and accurate result. The open-endedness of this method as outlined above lends itself particularly well to Third World situations, in which information about a region is often scarce and at times inaccurate. Information is not always readily available as the Planning Department responsible for the specific region does not have the most sophisticated means at their disposal.

The Potential Surface Analysis

This method is aimed at scanning the potentials present in a region and presenting the findings, in such a way that rational decisions (the degree of rationality being limited by the amount of information available) may be taken with regard to the location of future settlements and feasible development strategies may be determined.

As used by the I.S.P. a grid of 10 x 10 km was drawn on the regional plan area.

Various potentials were defined and translated to scores per 10 x 10 km square in the grid. The score indicated the favourability of one square (or group of squares) for development relative to another square (or group of squares). The findings of this P.S.A. are to be re-used for the present regional planning process.

The Threshold Analysis

An adapted form of the Threshold Analysis was used to determine in greater detail (5 x 5 km squares) which areas are more suitable than others for human settlement. Various factors were considered e.g. drainage, soil structure, terrain, vegetation, water, and it was possible to determine which squares were most favourable for human settlement once threshold lines (lines beyond which extra investments are required for human settlement all else being equal) had been fixed, thereby eliminating the areas which for one reason or another were more expensive to settle on.

As with the P.S.A. (to which it shows some correspondence) the findings of the Threshold Analysis will also be re-used in the framework of the present planning process.

The three methods outlined above have certain drawbacks, to be evaluated later, but they have emerged as suitable techniques for regional planning in a frontier region of a Third World country.

C Views on Regional Planning

Regional planning in the Third World is a fairly recent phenomenon, and already there is a fair amount of literature available on this subject. See the Appendix Report for examples.

Although the term Regional Planning is often used, Hilhorst has stated that there exists no comprehensive definition of this term, although he states that the need for the use of the term indicates an awareness of problems and planning strategies that play a significant role in the development of a country at this level of aggregation.

The role of regional planning is defined as follows at the Stockholm Conference of the United Nations on the Human Environment in 1972:

' The major issue for regional planning is the interrelationship between the various settlements of the region (author's note: existing or planned) and between the settlements and the rural areas.

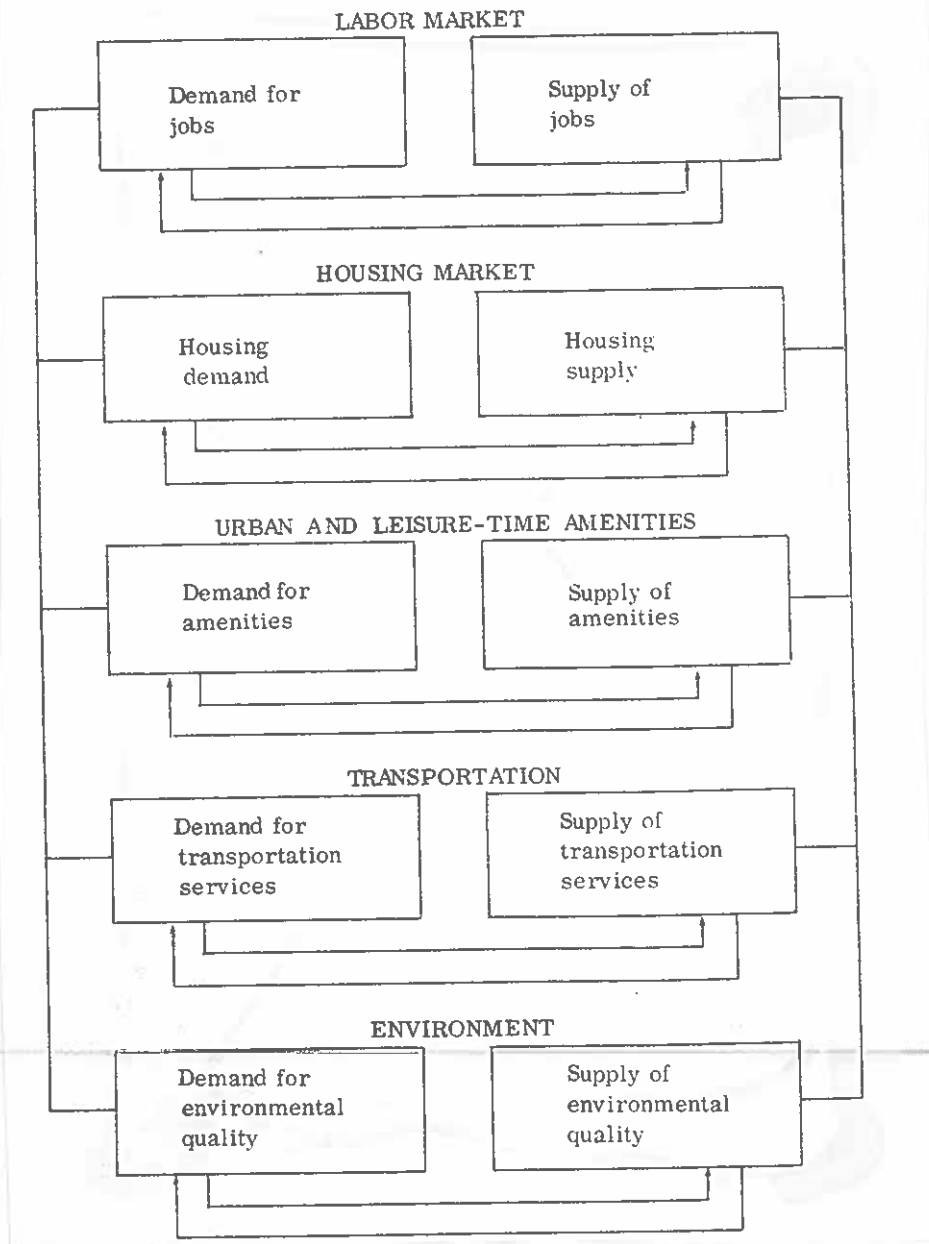
The regional comprehensive plan should therefore decide the focal points for urban growth, the distribution of industry, the layout of infrastructure systems, the means of waste disposal, the location of large-scale recreational areas and open spaces and the scope for the protection of high quality land, pg. 70 of the Compendium of United Nations Papers, 1974.

It further states that: 'Regional planning permits the establishment of realistic local goals and provides a framework within which development projects of national and local significance can find their proper place'.

Hilhorst (1971) indicates that the following co-ordination is necessary for effective regional planning:

- (i) Co-ordination in policy preparation at national and regional level.
- (ii) Co-ordination of national sectoral executive action.
- (iii) Co-ordination of regional sectoral executive action.
- (iv) Co-ordination between action by regional and national executive agencies.

Paul Drewe (in Kuklinsky 1977) has visualized and defined the prominent sectors of regional policy and their interrelation in the following Diagram:



As far as the implementation of regional development policies is concerned, Utria (in Kuklinsky 1977) is of the opinion that this involves 'conflicting decision-making processes, entailing as it does the definition of options, alterations in the balance of power and interregional relationships, the granting of privileges and incentives, and the assignment and reassignment of status and functions.'

Utria makes the following distinction in regional development: ' In industrialized countries, regional development is largely a problem of distributing and placing in less developed regions the surpluses produced in the dominant regions . In Developing countries, however, the question is not so much to transfer such surpluses, but essentially to foster local social conditions for them to take root and bear fruit in the new environment'. For that reason, ... Kuklinsky's (1970) suggestion of drawing a clear distinction between 'allocative' and 'innovative' (regional) planning policies, is particularly appropriate.

d Outline: Sequence of Work Phases

In its broadest lines, the work process included three main phases, viz.

- a) defining/describing the problem
- b) analysing and selecting alternative solutions
- c) describing what action should be taken (Regional Plan)

The Strategic Choice Process describes the planning phases in greater detail, and by adapting/referring to these phases, eight main work/planning phases were developed. These are described in outline below, and subsequently in greater detail.

Phase 1 -- The Problem Brief

Why This Phase: As the focus of planning action is West Suriname, obstacles to its efficient development need to be defined to determine the limits in which regional activity is possible and the problems which should be alleviated by such activity.

How Described: The problems are described within four decision area categories (spatial, social, economic and managerial). These categories are used throughout the work process to enable comparison/evaluation of similar decision area categories.

Conclusion: Main problems and obstacles to the development of the region describe the broad focus and limits of development action, a focus which is sharpened in Phase 2 when the desired action is defined.

Phase 2 -- Policy Values to Guide Regional Planning Control

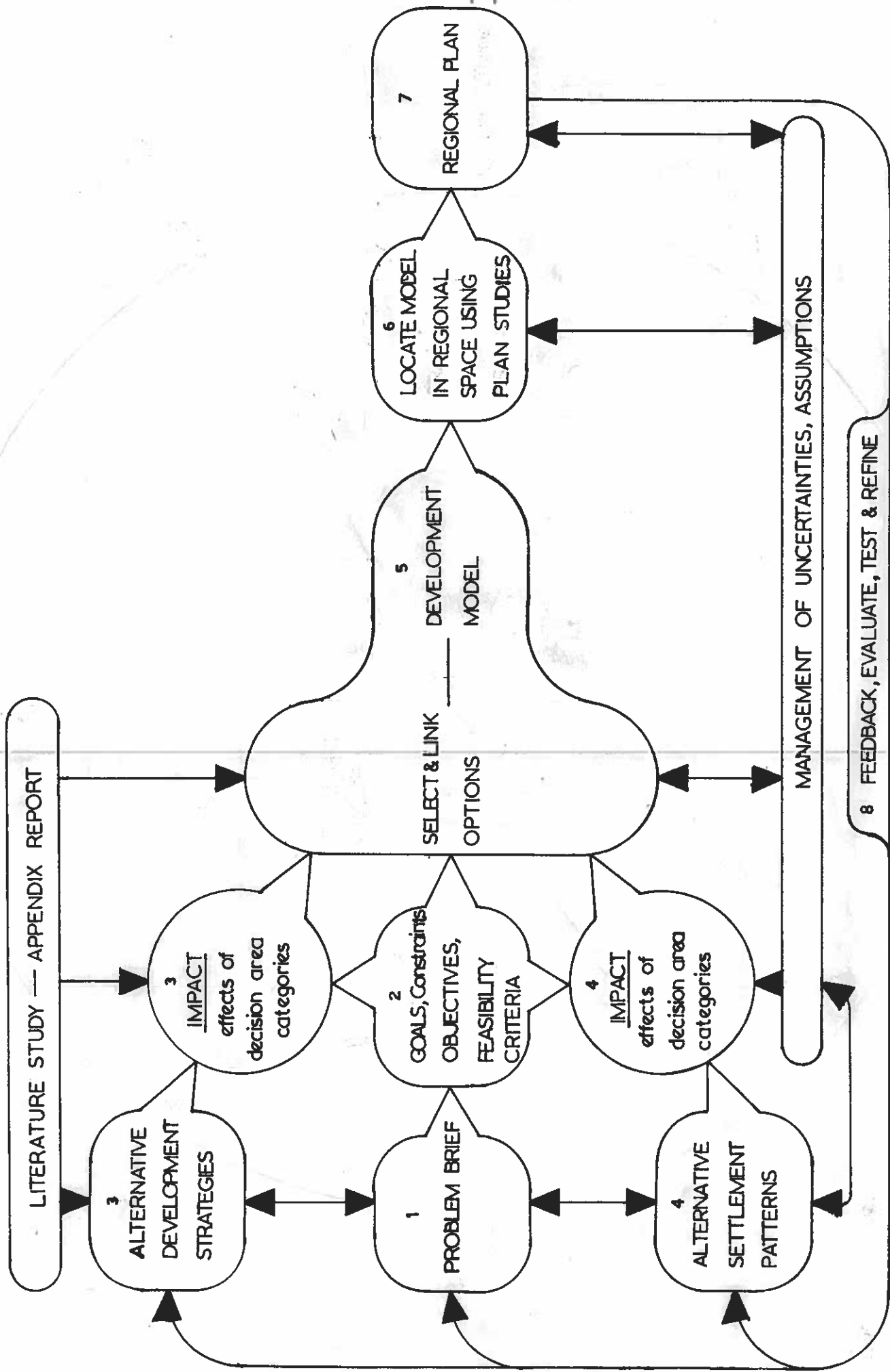
Why This Phase: Using the findings of Phase 1, the second phase of the work process is concerned with a sharper focus and definition of the direction that regional planning control should take. To this end goals, constraints and objectives are formulated, these resulting from Phase 1 on the one hand, but also subjective (policy) values on the other.

How Described: Goals, constraints and objectives are described at specific levels of spatio-managerial aggregation i.e. inter-national, national, and regional level.

Conclusion: Goals, constraints and objectives aid decision making and evaluation of alternatives because they describe the direction and the values to which planning action should remain true. They are of especial use in the following phases 3,4 and 5 for example, as they create a basis for evaluation and selection of alternatives.

Phase 3 -- The Development Strategies Approach

Why This Phase: Being aware of the problems that require alleviation (Phase 1) and the desired direction of action (Phase 2) the substance



WORK/REGIONAL PLANNING PROCESS

of development action needs to be filled in to culminate in a regional development model. In Phase 3 development strategies are studied on their specific impacts so that the optimal strategy combination may be determined.

How Described: Four main development strategies are each analysed per decision area categories. They are then linked in various combinations which are compared on favourability using the policy values.

Conclusion: The optimal strategy combination A is generated and it requires a fitting spatial settlement pattern to form a development model.

Phase 4 -- The Analysis of Regional Settlement Patterns

Why This Phase: Characteristics of alternative settlement patterns need to be studied to combine an appropriate pattern with the most suitable development strategy combination thereby generating a theoretically optimal development model for the region.

How Described: Alternative settlement patterns are identified and their characteristics described per decision area category.

Conclusion: A comprehensive description of the characteristics of alternative settlement patterns enables selection and linking of settlement patterns with the most suitable development strategy combination A.

Phase 5 -- Towards a Development Model

Why This Phase: Development Strategy A should be combined with one of the settlement patterns with which it is most compatible to arrive at a Development Model.

How Described: Development strategy A is compared on compatibility with all alternative settlement patterns in each case per decision area categories. An option graph with option bars is set up to visualize (in)-compatibility.

Conclusion: The Development Model for the region emerges from the option graph, and this Development Model should now be located in specific (West Suriname) regional space.

Phase 6 -- The Regional Specific Analysis

Why This Phase: The abstract development model must be "brought down to the most suitable regional earth" and this is achieved by analysing regional specific potentials to locate the best space for specific activity.

How Described: Using maps the natural/man made potentials of the region are visualized, as well as areas which emerge as being unsuitable for development (i.e. mandatory for preservation). The development model is then located in the most suitable areas i.e. areas with greatest potential

for specific activity. Alternative plan studies (Appendix Report) formed the spatial background to the final proposed plan layout.

Conclusion: A development Model optimally located in regional space.

Phase 7 -- The Regional Plan

Why This Phase: Following directly on Phase 6, and indirectly on all other previous phases, Phase 7 sets out to describe in some detail what action should be taken to implement the regional-specific development model as efficiently as possible. Uncertainties, though playing a role in all phases, are highlighted in this phase to indicate which future studies are required, albeit beyond the scope of this thesis.

How Described: An outline of the proposed plan is given, and this is followed by more detailed proposals for the spatial, social, economic and managerial sectors. Phasing of implementation is described and lastly required future studies of import to the proposed regional development are indicated.

Conclusion: Substantive proposals for comprehensive regional development are described in detail, but do they correspond with stated policy values, (Phase 2) and was the planning process clear, and consistent? This question has to be answered in the following phase.

Phase 8 -- Evaluation

Why This Phase: If the work process is divided into a substantive side and a procedural side, then both aspects need to be tested for internal consistency. This happens spontaneously during each phase, but it may be formalised in the last phase of the work process, i.e. substance and process may be formally evaluated with as purpose the sleuthing out of inconsistencies, discrepancies, info-vacuums, unfounded decisions and foggy descriptions.

How Described: Substantive findings are evaluated by comparing them to other plans/ideas for the same region. This could be termed external substantive evaluation. Internal substantive evaluation includes the testing of consistency between policy values and plan proposals. Procedural evaluation is described for aspects such as the aggregation level of the planning task, choice/use of methods and clarity of the work process.

Conclusion: Feedback and sleuthing is valuable to the improvement of both substantive and procedural results of the work process.

e Detailed Sequence of Work Phases

Following on the outline of the work phases a detailed description of phases and their sub-phases is provided as overview of the report's structure/content.

Detailed Sequence of Work Phases

Phase in work process	Contents - Heading	Input	Output
Phase 1	Problem Brief -- Problems as precedent and Constraint to Realistic Planning Action in West-Suriname		
Phase 1.1.	<p><u>Ecosystem</u> Existing Human Settlements Paramaribo</p> <p>New Nickerie</p> <p>Moengo</p> <p>Ribbon Settlements</p> <p>Smallest (Indian) villages</p> <p><u>Man-made Structures</u> Roads</p> <p>Hydro-electric dam at Brokopondo</p> <p><u>Landscape/Nature</u> Climate</p> <p>Vegetation</p>	<p>Characteristics of capital city or Suri-name?</p> <p>What is the 2nd largest town in Suriname like?</p> <p>The nature/workings of a typical existing mining town?</p> <p>What settlement pattern(s), after cities & towns prevails?</p> <p>What is the life style/activity in a typical village?</p> <p>Which are main connections inter-regionally?</p> <p>How does an exist. large dam affect the environment? As precedent to West-Suriname.</p> <p>How does climate differ in Suriname?</p> <p>What kind of vegetation does Suriname have?</p>	<p>No. of inhabitants, urban blight, traffic, street layout, water supply/disposal.</p> <p>Diagram of soil use at New Nickerie, indicating layout & types of crops.</p> <p>Services in the town integration with rural surroundings.</p> <p>Location and activity of ribbon settlements.</p> <p>Utilization of simple resources and labour intensive techniques.</p> <p>Location & use-intensity of present (& planned) road.</p> <p>Various impacts identified for Broko-pondo.</p> <p>Rainfall, sun angles, temperatures & wind as usually prevailing.</p> <p>Main vegetation type and its response to human activity is finely tuned.</p>

Phase in work process	Contents-- Heading	Input	Output
Phase 1.2.	<p>Soil Structure</p> <p><u>Social Qualities</u></p> <p>Hyper-urbanised society</p> <p>Extended family system</p> <p>Patronage system</p> <p>Criminality</p> <p>Soft state</p> <p>Social classes</p> <p>Ethnic Groups</p> <p>Age-group composition</p> <p>Migration</p> <p><u>Economic Position</u></p> <p>Occupational incomes</p> <p>Bauxite production</p> <p>Export</p> <p>Joint ventures</p>	<p>Are soils fertile and where do they occur?</p> <p>What is a general characteristic of most Surinamese-?</p> <p>Survival system?</p> <p>Are marginal practices evident?</p> <p>Who commits most crimes?</p> <p>Is there any social discipline?</p> <p>Are strata integrated by gradual class differences? or is there unrest & revolt?</p> <p>Could ethnic differences affect development?</p> <p>What has been the trend in births and deaths? Is it a 'young' or 'old' population?</p> <p>Migration trends and destinations?</p> <p>What is the income range from place to place, but also from occupation to occupation? i.e. who and how many are rich or are poor?</p> <p>What is main economic activity of Suriname at present?</p> <p>What returns from main economic activity? Is local economy in hands of Suriname or do outsiders also play a role?</p>	<p>Ores found in soil, general location of infertile and fertile soils.</p> <p>Bazaar economy as means to survival for many.</p> <p>Reliance on family and friends.</p> <p>Favours & 'fixing' between rich & poor.</p> <p>Urbanised squatter youths.</p> <p>Corruption supercedes social disciplin</p> <p>Sharp line between rich & poor, not between ethnic groups.</p> <p>Ethnic groups are largely integrated at present. Javanese remain underdogs.</p> <p>Birth rate since 1962.</p> <p>Death rate since 1950</p> <p>Out-migration to Holland & its affect on ethnic group sizes.</p> <p>Overview of regional incomes; comparison of incomes per occupation.</p> <p>Production phases of bauxite.</p> <p>Government profit.</p> <p>Influence of foreign Countries/ industries.</p>
Phase 1.3.			

Phase in work process	Contents - Heading	Input	Output
Phase 1.4.	<p>Brokpondo dam</p> <p>Agricultural employment</p> <p>Trade/commerce</p> <p>Government service</p> <p>Forestry</p> <p><u>Organize/Management</u></p> <p>Relationship with the Netherlands</p> <p>Planning departments</p> <p>Cooperatives</p> <p>Challenges</p> <p><u>Existing plans for/by Suriname (national).</u></p> <p><u>Existing Regional Plans for West-Suriname</u></p>	<p>Was, & is this dam feasible? This question to avoid same problems in West-Suriname.</p> <p>Employment trends in this sector?</p> <p>What role does this sector play?</p> <p>Is burocracy efficient?</p> <p>How is present forestry done?</p> <p>What development aid is forthcoming?</p> <p>What planning bodies exist & what is their duty?</p> <p>Do cooperatives work as small management units at present; & if not, why not?</p> <p>What are greatest problems to be managed first?</p> <p>What are present plans for all regions in Suriname?</p> <p>Having seen that West-Suriname has first priority in Suriname, what does this regional development entail?</p>	<p>A hard look at implementation and present local usability of this existing dam.</p> <p>Disparity large scale - small scale, rapid decrease in labour force.</p> <p>Excessive import.</p> <p>Marked increase in a non-productive paper work sector.</p> <p>(Over) intensive selective cutting in large areas by multi-national (who has gone to Belem in Brazil now).</p> <p>CONS controls 3,5 mill. spread over 10 years in ratio 1/2:1/4:1/4.</p> <p>Planning department duties.</p> <p>Cooperatives are not yet fully recognised as a tool to self reliance.</p> <p>Basic needs, work, social services for the poor.</p> <p>Eight concentration areas, of which West-Suriname is to receive the most investments.</p> <p>Bauxite mines, expensive railway & harbour, one large urban centre at Apoera.</p>
Phase 1.5.			
Phase 1.6.			

Phase in work process	Contents - Heading	Input	Output
	<p>Mining</p> <p>Railway</p> <p>Camp 52</p> <p>The dams</p> <p>Apoera</p> <p>Agriculture</p> <p>Indians</p> <p>Coranthijn Canal</p>	<p>How many men in the (new) region as a planned minimum? Is export of bauxite safe?</p> <p>What is main infrastructure in region?</p> <p>Railway workers - where do they live? What happens to un-exported bauxite?</p> <p>Are any settlements planned in the region?</p> <p>What other activities besides mining are planned?</p> <p>Are there local inhabitants in the region, and if so, what happens to them?</p> <p>What is West-Suriname's relationship (function) to coastal belt?</p>	<p>2 200, which means at least 8 000 people (families). Export depends on fluctuations in the world market.</p> <p>A railway from mine to harbour at Apoera located on a watershed ridge - soil erosion is an eminent problem.</p> <p>Coranthijn river provides a natural waterway to the sea.</p> <p>600 at crossing of road with railway.</p> <p>Two dams providing 500 MW to aluminium factories must still be constructed.</p> <p>One large city (& nothing more) is under construction on the banks of the river. Industries & a harbour are planned to locate there.</p> <p>Some small scale vegetable gardens at Apoera. 10 000 ha to (possibly) be cleared next to railway after 1982 for growing of oil palm, slash & burning of forest for charcoal & timber - complete clearance is highly dangerous.</p> <p>Land rights denied, social problems, little confidence in future.</p> <p>Provides fresh water to rice polders at New Nickerie via Coranthijn Canal.</p>

Phase in work process	Contents - Heading	Input	Output
Phase 1.7.	Other plans/ideas for West-Suriname	Are alternatives/variants proposed as comment/criticism/supplement to the existing plans?	The plans/ideas of Dhr Sedney, ISP, PALU (Union), Drs Chin and Mr Rodgers
Phase 2	Policy Values to Guide Regional Planning	Towards a Direction of Regional Planning Action.	
Phase 2.1.	<u>Defining the Regional Planning Task</u>	What is the purpose of the task? Who is the target of planning action?	Broaden views. Benefit to poorest class, need for further research planners, poorest class, marginally employed/underemployed.
Phase 2.2.	<u>A Theory of Underdevelopment</u>	What is the relationship of an underdeveloped country to a developed one? How do underdeveloped countries develop?	Centrum - periphery dependency categories (Galtung). Fragmented modernising (Hinderink).
Phase 2.3.	<u>Goals</u>	Bearing problems in mind, what direction should planning action take at national level?and regional level?	Spatial, social, economic & managerial goals.
Phase 2.4.	<u>Constraints</u>	Which factors (problems) prevent/impe- the achieving of above goals?and at national level?at regional level?	Spatial, social, economic & managerial goals for development of West-Suriname. International constraints to desired/desireable development. National spatial, social, economic & managerial constraints. Regional spatial, social, economic, managerial constraints.
Phase 2.5.	<u>Objectives</u>	Bearing the above constraints in mind, which objectives (more operational goals) may be formulated and have greater emphasis.	Regional, spatial, social, economic, managerial objectives to which planning should remain true. Objective achievement priority.

Phase in work process	Contents - Heading	Input	Output
<p>Phase 3,4 & 5 The Analysis of a Theoretical Regional Development Model</p> <p>Phase 3 Alternative Development Strategies and Their Impact</p>			
Phase 3.1.	<u>The Divergent Analysis</u>	<p>What are the decision area categories which require analysis?</p> <p>Which aspects determine feasibility of planning action? and favourability?</p>	<p>Spatial, social, economic & managerial decision areas with their sub-categories. Feasibility criteria</p> <p>Policy values such as goals & objectives, already described.</p>
Phase 3.2.	<u>The Effects of Large Scale Industry</u>	<p>What impact/effect does the propulsive sector large scale industry (read bauxite mining) have per decision area?</p>	<p>Spatial effect - pollution, waste, random location, slums. Social effect - isolated, alienating. Economic effect, Managerial effect. Comment = conclusion</p>
Phase 3.3.	<u>The Effects of Small Scale Industry</u>	<p>What impact/effect does small scale industry (read forestry) have?</p>	<p>Spatial, social, economic & managerial effects. Comment = conclusion</p>
Phase 3.4	<u>The Effects/Requirements of Large Scale Agriculture</u>	<p>What impact/effect does large scale agriculture (read oil palm, peanuts) have?</p>	<p>Spatial, social, economic & managerial effects. Comment = conclusion.</p>
Phase 3.5.	<u>The Effects of Small Scale Agriculture</u>	<p>What impact/effect does small scale agriculture (read vegetables, fruit, poultry & dairy) have?</p>	<p>Spatial, social, economic, & managerial effects. Comment = conclusion</p>
Phase 3.6.	<u>The Combination of the Strategies</u>	<p>Which strategy combination of all possible combinations emerges most favourable?</p>	<p>Matrix comparing favourable & unfavourable impact to test combinations. Strategy A.</p>
<p>Phase 4 The Analysis of Alternative Settlement Patterns and Their Impacts</p>			
Phase 4.1.	<u>The Hierarchical Structure of Settlements</u>	<p>What is a possible settlement hierarchy for Suriname?</p>	<p>Van Dusseldorp's proposal, Friedmann's organization, Rehovot Settlement Hierarchy.</p>

Phase in work process	Contents - Heading	Input	Output
Phase 4.2.	<u>Relationships between Settlements</u>	What are the lengths of influence radii of diverse settlements? (To be operationalised later).	Theoretical study of one, three & many settlements.
Phase 4.3.	<u>Settlement Strategies</u>	Which alternative settlement strategies are possible in a frontier region?	A single city only, concentrated development areas, existing settlements only
Phase 4.4.	<u>The Effects/Impact of a Single City Only</u>	What are effects/impact of a single city in a frontier region?	Spatial, social, economic & managerial effects.
Phase 4.5	<u>A Single City & One or More Towns</u>	What are the effects/impact of a single city with one(or two) towns in a region?	Spatial, social, economic, & managerial effects.
Phase 4.6.	<u>A Range of Settlements</u>	What impact/effect does a range of settlements have?	Spatial, social, economic, & managerial effects. Comment = conclusion.
Phase 4.7.	<u>Existing Settlements Only</u>	What are the effects/impact of developing existing settlements only in the region?	Spatial, social, economic & managerial Effects.
Phase 5	Towards a Development Model		
Phase 5.1.	<u>Introduction</u>	What are the relationships between alternative settlement patterns individually & the favourable development strategy?	Two relation Graphs visualizing relationships.
Phase 5.2.	<u>Compatibility A -- 1)</u>	How compatible is development strategy with the single city only?	Testing of compatibility in spatial, social, economic & managerial decision areas. Conclusion.
Phase 5.3.	<u>Compatibility A -- 2)</u>and with a single city with one or two towns?	Testing of compatibility with option bars. Conclusion.
Phase 5.4.	<u>Compatibility A -- 3)</u>with a full range of settlements?	Testing per decision areas with option bars. Conclusion.
Phase 5.5.	<u>Compatibility A -- 4)</u>finally with existing settlements only?	Testing. Conclusion.

Phase in work process	Contents - Heading	Input	Output
Phase 5.6.	<u>Review</u>	Which development model emerges when all option bars are considered?	Strategy A linked to a range of settlements becomes the development model.
Phase 6	Regional Specific Analysis - The Development Model Located in Regional Space		
Phase 6.1.	<u>The Potential Surface Analysis</u>	What were the results of this analysis previously completed by ISP West-Suriname?	Priority Areas 1 and 2 were selected for further Threshold analysis.
Phase 6.2.	<u>The Threshold Analysis</u>	What were the results of this analysis per priority area?	Maps with Threshold lines - specific suitable areas for settlement.
Phase 6.3.	<u>The Location of the Development Model</u>	How is the development model to be located in regional space? What criteria determine location?	Diagram showing cyclical work process of locating the development model. Model use-criteria and natural criteria described & visualized in various maps.
	Plan Studies (Appendix Report) Settlement Location	How are alternative locations evaluated?	Three plan studies precede the settlement location diagram.
	<u>Total Range & Number of Settlements</u>	Where can settlements locate in the region?	Map indicating location of settlements and description.
Phase 6.4.		What range and number of settlements can locate in the region (all things considered)?	Type of settlement and its location in the region.
Phase 6.5.	<u>Comment</u>	What is the flexibility, feasibility and ecosystem impact of the settlement locations as proposed?	Comment on these aspects and uncertainties in defining settlement locations.
Phase 7	The Regional Plan -- A Proposed Program for the Development of West-Suriname		
Phase 7.1.	<u>The Program in Outline</u>	In overview, what are the main proposals of the regional plan?	Brief description of spatial, social, economic, & managerial proposals.

Phase in work process	Contents - Heading	Input	Output
Phase 7.2.	<p>Concept</p> <p><u>The Regional Spatial Pattern</u></p>	<p>What concepts underlie the structure of the regional plan?</p> <p>What are the detailed proposals of the spatial pattern?</p>	<p>Map visualizing spatial, social, economic & managerial plan concepts.</p> <p>Settlement sizes and services, transport routes. Max./min. travelling distance, plan of settlements showing service rayons & activity areas. Water supply, infrastructure, cultivation.</p>
	Agriculture	<p>What are the requirements of 1 000 people for their own self sufficiency in West-Suriname?</p>	<p>Tabel showing min. requirements per 1 000 people, and also per village of 250 people.</p>
	Forestry	<p>What other main activity is possible & feasible in West Suriname?</p>	<p>Forestry carried out in specific areas under strict control.</p>
	Complementary Activities	<p>What smaller complementary activities are feasible?</p>	<p>Fishing & fishery. Flower growth & collection under strict control.</p>
Phase 7.3.	<u>The Social Structure</u>	<p>Who is the target group of the regional plan?</p>	<p>Marginal farmers, unemployed Surinamese.</p>
	Basic needs/quality of life	<p>What receives priority in first phases of settlement?</p>	<p>Subsidies, provision of basic needs, houses.</p>
	In-migration	<p>Who will come to the region?</p>	<p>Subject to an applicant survey as soon as possible.</p>
	Social Services/structure	<p>What type of services & structure is proposed?</p>	<p>Education, min. polarization, communal participation.</p>
Phase 7.4.	<u>The Economic Sector</u>	<p>What are the main employment/production activities proposed by the regional plan?</p>	<p><u>Agriculture</u> - mainly small scale</p> <p><u>Mining</u> - on middle-long term</p> <p><u>Forestry</u> - clearing dam site, selective cutting, planting. <u>Other sectors</u>-- complementary activities e.g. fishing.</p>

Phase in work process	Contents - Heading	Input	Output
Phase 7.5.	<p><u>The Managerial Sector</u> Rights of the Indians Managerial Task</p>	<p>How are land rights of local Indian inhabitants to be managed? What is the task of managing/organizing proposed development?</p>	<p>Laws to be passed on land retention & participation. Rural development committees participation in villages. Taxes, long term land lease. Extension workers. Regional planning department.</p>
Phase 7.6.	<p><u>The Development Process</u> Phasing of Implementation</p>	<p>In what time sequence should settlements and related activities be set up? Which dates are critical in the phasing program?</p>	<p>Time/activity phasing tabel. Phasing map. Growth rate of Apoera, testing period.</p>
Phase 7.7.	<p><u>Management of Uncertainties</u></p>	<p>Which uncertainties played a role in the regional plan - uncertainties which require future study, beyond the scope of this thesis. What assumptions were made when planning/deciding?</p>	<p>Operating environment uncertainties (UE) Policy value 'uncertainties' (UV) Policy areas uncertainties (UR) Spatial, social, economic & managerial Spatial, social, economic & managerial assumptions.</p>
Phase 7.8.	<p><u>Realism of Proposed Regional Plan</u></p>	<p>In conclusion, how realistic are the proposals of the regional plan?</p>	<p>Plan is realistic, subject to further studies, surveys & testing period.</p>
Phase 8	Evaluation of the Work/Planning Process and Substance		
Phase 8.1	<p><u>Substantive Evaluation</u> National Spatial Equity</p>	<p>How can the goal of national spatial equity be achieved at present in Suri-name?</p>	<p>Productive equilibrium between city-region, town-rural area by inhabiting frontier land with due regard to ecological impacts.</p>

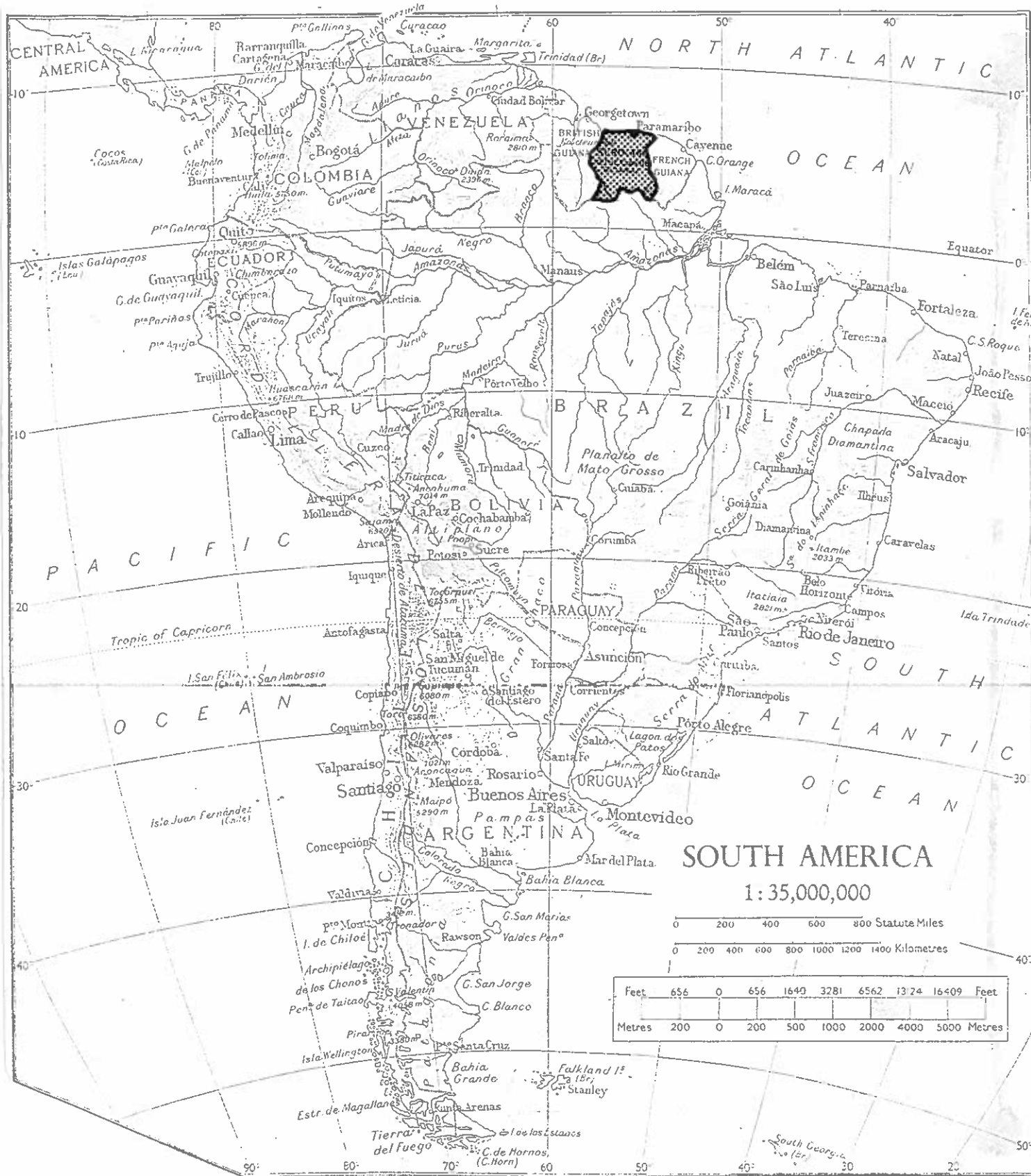
Phase in work process	Contents - Heading	Input	Output
Phase 8.2.	<p>Testing Proposed Plan</p> <p>Internal substantive evaluation</p> <p>Consistency</p> <p><u>Procedural Evaluation</u></p> <p>Personal Position as Regional Planner</p> <p>Aggregation Level of Planning Task</p> <p>Need for Regional Planning?</p> <p>Choice/Use of Planning Methods</p> <p>Strategic Choice Process as used for Regional Planning</p> <p>Participation in the Planning Process</p> <p>Presentation of Report</p>	<p>How do substantive proposals of regional plan compare with those of other plans/ideas for the same region?</p> <p>How consistent were goals, objectives with what has been proposed?</p> <p>Where do I stand in the planning process?</p> <p>What is the level of study in the main?</p> <p>What is the value of regional planning?</p> <p>Why were methods chosen to add planning/work process?</p> <p>How useful was this process in planning?</p> <p>Is participation necessary in the Third World?</p> <p>How was clarity strived for in presenting the work process?</p>	<p>Table comparing main alternative plans/ideas for West-Suriname, incl. the one proposed in the report. Plan visualizing above comparison.</p> <p>Testing goals & objectives against substantive plan proposals.</p> <p>Not responsible to client or employer therefore I had relative freedom of action.</p> <p>Regional and sub-regional level. National regional selection was'nt done.</p> <p>Project coordination/employment.</p> <p>Rationality, clarity, ease of testing, participation, structuring framework.</p> <p>Management of uncertainties emerges an useful planning tool.</p> <p>Important to decision making at all stages of planning process.</p> <p>By closely following the work process in its eight main phases.</p>

PART TWO

REGIONAL

PLANNING

PHASE 1

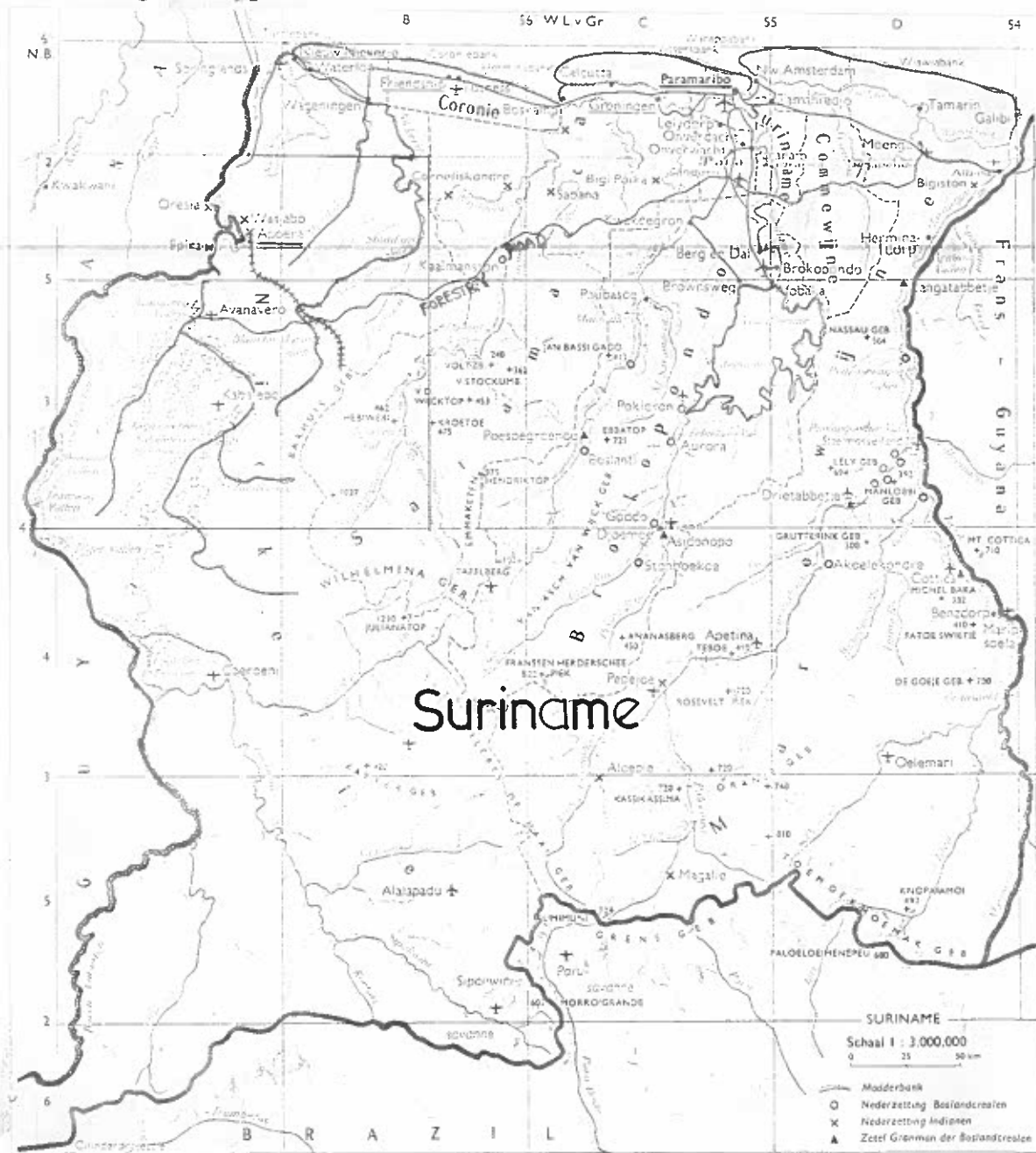


Location of Suriname in Macro Context. Source: Times Atlas.

1.0 Problem Brief: Description of Existing Conditions in Suriname

Introduction

The description which follows is intended as an outline of conditions and a brief to the planning problems which exist in Suriname - problems which need and could be alleviated by, amongst other means, regional planning and development. The description/statistics of existing problematic conditions in Suriname included here are by no means comprehensive the colonial history which forms the basis of some problems has not been described, for example. For those interested in this, or other aspects not touched on here, there are many books and of late a comprehensive encyclopaedia (1977) available on Suriname, edited by W. Gordijn. The map which follows indicates the location of Suriname in meso-context, as well as indicating the location of the capital city, various towns and other physical characteristics which are referred to in the course of the following description.



The Ecosystem and its Spatial Translation ..

An Ecosystem is a dynamic system of all the organisms - plant and animal (including man) - living in one place at one time. It represents the combined use by plants and animals of the resources provided, in one place at one time, by the surroundings. Resources such as air, water, nutrients, heat and light are utilized, transformed or stored differently by different organisms, and returned to the non-living state.

The Surinamese ecosystem is first described in terms of man- his settlements (cities, towns) structures (dams, roads, railways) and resources that he makes use of (bauxite, water, soil, or animals). Plants, vegetation and animals as found in the ecosystem are then described:

- what species are found, how they grow/live and return resources to the non-living state.

Lastly the climatological factors which are responsible for certain characteristics of the ecosystem are described. All this to define the spatial characteristics (biotic or a-biotic) prevalent in Suriname.

Human Settlements

Paramaribo - Capital of Suriname

The most populous and most important city in terms of national economic and managerial reasons is Paramaribo, with a population of 102 000 within the city limits, and 196 000 within the urban agglomeration, being 50% of the entire population.

Services are concentrated within the Central Business District, and the suburbs rely mainly on these central services. There are no high population densities because of the absence of multi-storey buildings or row housing. The average population density of the capital is 35,6 persons/ha.

Unemployment has been estimated by J.K. Brandsma to be as much as 30%, a bazaar economy (proto-proletariat) being much in evidence in Paramaribo. Economic activities (industry, trade, shops, markets) as well as state activities (planning, law and order, parliament) are all concentrated in the capital, 78% of the total national working population being located there.

Some of the problems of Paramaribo's urban fabric include-:

- 12 000 erven-houses i.e. second houses built on what were previously spacious sites for one dwelling only.
- a number of bottle necks in the transport network, and increasing through traffic.

- as much as 50% of traffic consists of motor-bikes and push carts.
- the supply of potable water is inadequate, with as much as 30% being lost because of leakages in the steel waterpipe system constructed in the thirties.
- certain low lying streets are flooded at least ten times a year as a result of the tropical rains which flood the mixed water/ sewage system.

Friedmann(1973) suggests that a hyper-urbanised society in a primate city is the resultant of the following three conditions:

- a) a slow growing economy (one sided dependence)
- b) rising expectations of the poor for a better stake in society
- c) increasing misery especially in the rural areas.

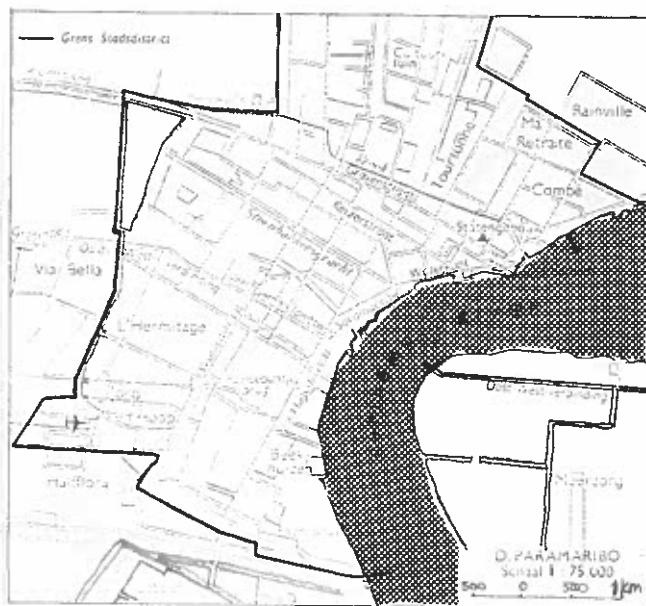
According to Friedmann primate cities are usually found in small countries low in their per capita income with export-orientated economies and a colonial history - a description that closely fits conditions in Suriname.

Following on the capital it should be noted that the second largest Surinamese city is Amsterdam, with 35 000 Surinamese inhabitants - the result of mass emigration before Suriname's independence in 1975.

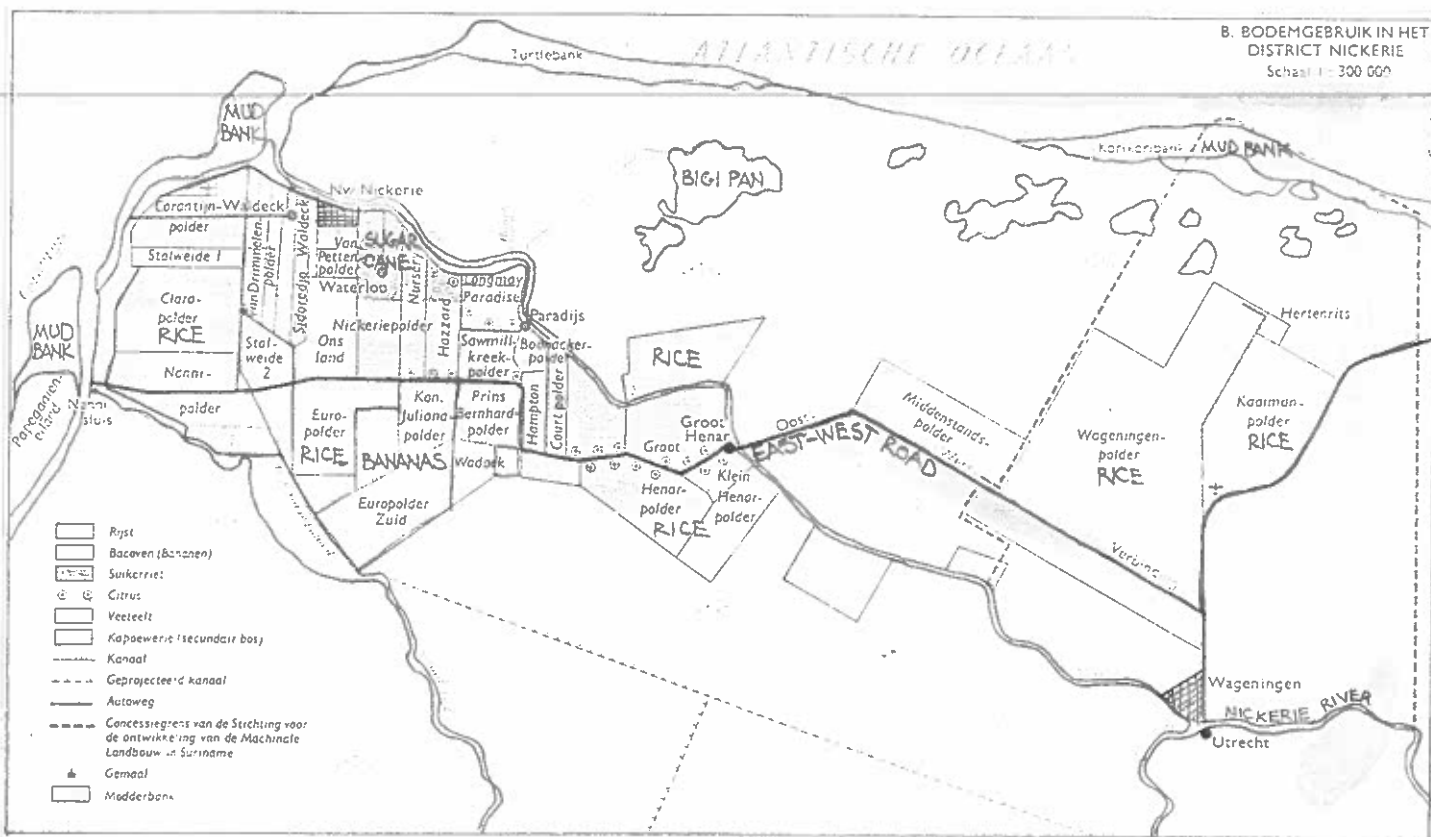
Staying within Suriname, the second largest city is New Nickerie with 7 200 inhabitants. It is a district center with a body for the management and control of the district. It too is spacious with low densities. The street layout is a right angled grid in the center with ribbon development at the periphery having small/large scale farming.

Moengo is an example of a bauxite mining town, whilst Wageningen is an example of a large scale agricultural town with 3 500 inhabitants. Both towns were set up by companies: Moengo by the Surinamese Aluminium Company (Suralco) and Wageningen by the Foundation for Mechanised Agriculture, and this is apparent in the neatly laid out and sharply delineated urban fabric.

Moengo has 700 dwelling for employees of Suralco and approximately 5 000 inhabitants. There are eight schools, ranging from nursery to high school, a hospital with two medical doctors and 60 beds and a theater seating an audience of 600. There are 180 cows which provide 800 l of milk per day, and Moengo has its own abbatoir for its meat supply. Moengo functions independently of its environment, providing limited or no economic benefits to the rural inhabitants in its vicinity.

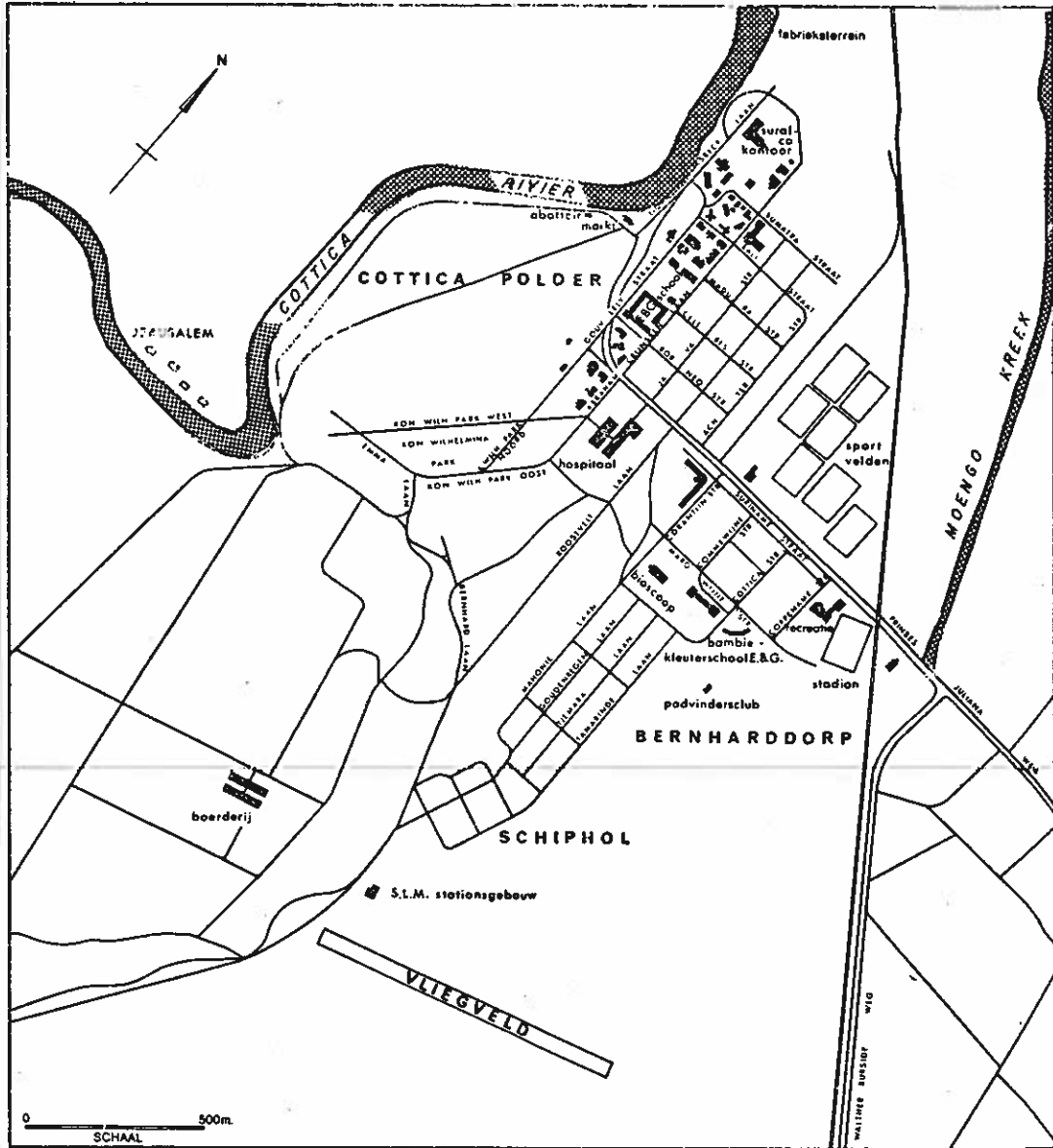


PARAMARIBO



CULTIVATION & SOIL USE IN THE DISTRICT NICKERIE

Source: Grote Bosatlas 1976



Town planning layout of Moengo Source: Encyclopaedia of Suriname

Ribbon settlement is the most prevalent settlement pattern besides the few concentrated settlements mentioned above.

The main occupation is subsistence-farming on individually owned plots of land next to the road. Densities of such settlements decrease with increasing distance from a large settlement.

The smallest settlements - villages - form the dwelling place of local Indians or 'Forest Negroes'. In West-Suriname, for example, there are four Indian villages, viz. Apoera, Washabo, Mátapi, Avanavero. Food is obtained from self planted crops on small plots and fishing. The life style is adapted to the rain forest surroundings, being simple, fairly isolated and devoid of services/creature comforts, and as such is not extremely harmful to the local ecosystem.

Activities are varied spatially (fishing here, hunting there, cultivating elsewhere) have a temporal consistency and do not make use of harmful technologies/products (large machines, disinfectants, artificial soil enrichers.)

Roads

A main transport artery in Suriname is the so-called 'East-West' - from Albina in the East to Springlands in the West. The main bottle necks in this road result from the river crossings by ferry, because of the lack of bridges at strategic crossings. Of late a forestry road to West Suriname has been constructed, forming a main transport link with this region. Apoera is approximately 350 km from Paramaribo via the forestry road, and this road has \pm 2 000 vehicles (mainly forestry and mining transport trucks) per day, a figure which nearly equals that of the East-West.

A new road is under construction which will link Apoera to New Nickerie, a distance of 112 km.

In general the road network is most developed and extensive in the vicinity of Paramaribo.

The Brokopondo Hydro-electric Dam

A detailed description of events which followed the inundation of forest at Brokopondo is given by Leentvaar in his paper to the International Congress of Ecology at the Hague in 1974. Here follows some extracts from the paper of especial interest as precedent for the two planned dams in West-Suriname:

The inundated forest

Large parts of the interior of Surinam are covered by tropical rain-forest. Several rivers run from south to north and empty into the Atlantic Ocean. Along the rivers a small autochthonous population lives in villages, but most of the people of Surinam are concentrated in towns situated along the northern coast. The influence of man on nature is restricted to areas around the villages, where the native people plant their vegetables and hunt animals, birds and fishes.

The construction of dams across the rivers in these regions represents a much more radical interference with the forest ecosystem. It means that vast areas of tropical rain-forest will be inundated, which totally changes the ecosystem. An example of this process is offered by the formation of Lake Brokopondo, which started in 1964 and now covers an area of about 1,500 km².

So far, only the effect of the damming of the Suriname River near Brokopondo have been followed. It took seven years for the lake to fill. Most of the forest, remained standing under water. No attempt was made to clear the bottom of trees in advance, because they did not burn and other clearing measures were too expensive. The trunks of hard-wood species emerge from the water, but the soft-wood species broke off at the water line and decayed. It is to be expected that many of these trees will remain where they are perhaps for centuries, a hindrance to navigation and fishery and also hampering the management of the lake as a source of water of good quality.

As everywhere in the tropics, a vegetation of floating vegetation was expected to develop and cover the open surface of the water. Lake Brokopondo was no exception, and two years after the completion of the dam an area of 41,200 ha or 53% of the existing surface (at that time) was covered by mats of water hyacinth (*Eichhornia crassipes*) (van Donselaar 1968). The former riverbed showed only a sparse growth of water hyacinth, probably due to the rapid rising and falling of the water level in wet and dry periods. After stagnation, the plant spreads rapidly, forming islands with the dead trees as nucleus.

The formation of these mats caused oxygen depletion of the underlying water, and the inundated forest seemed to have turned into a swamp. This was also indicated by analysis of the plankton communities in the water in the open spaces, which consisted mainly of species typical for shallow water. Among the roots of the water hyacinths populations of young fish, crustaceans, and insect larvae developed. (Leentvaar 1973).

The action of the wind on the water surface has increased, and after showers there are such high waves that navigation with small boats is dangerous. Above the surface of the water the lake shows only dead tree-tops with spiders' webs as the only sign of life. Birds are seldom seen. Under the surface however, there is a rich development of fish and plankton. Bottom flora and fauna are scarce. The action of the wind has improved the mixing of the water layers in open areas, but stagnation persists between the trees and this causes oxygen depletion locally already just under the water surface. The sinking down of dead water hyacinth plants is probably responsible for the slowing down of the initial improvement in the oxygen content observed in 1968. The fish are also affected by the disappearance of the water hyacinth, because the voracious pirang (*Serrasalmus rhombeus*), which was common before 1968, has decreased in number. This species apparently spawns in the roots of water hyacinths.

The transition on the banks of the lake to the living trees along the shore is sharp. There is no shore vegetation emerging from the water. It will probably take a very long time for rooting marsh plants to become established. Fluctuations in the water level will hinder the establishment of a shore-vegetation succession. In addition the nature of the subsoil, which is composed of a hard rock or laterite clay, is not favourable for rooting helophytes. The shallow and more or less sheltered parts of the vast lake area will in the time become favourable in this sense, after decaying organic matter from the surrounding forest has accumulated.

The conclusion to be drawn from these considerations is that large parts of this inundated forest - as a man-made lake - will be covered by floating swamp vegetation if control measures are not taken.

Climate

Climate may be defined as 'the characteristic condition of the atmosphere deduced from long periods of repeated observations', being an analysis of average values of parameters such as air temperature, winds and precipitation. Climate largely determines/forms the type of soil, natural vegetation, presence/absence of rivers in a region and consequently influences the utilization of land, whether for crop cultivation, forest or grazing. The distribution of population (concentrated/dispersed) strongly reflects the advantages of favourable climate and terrain.

Suriname has a tropical climate (sometimes called equatorial) as it lies within the latitude zone ten degrees north and south of the equator - 5-8°W longitude and 2-6°N latitude to be exact.

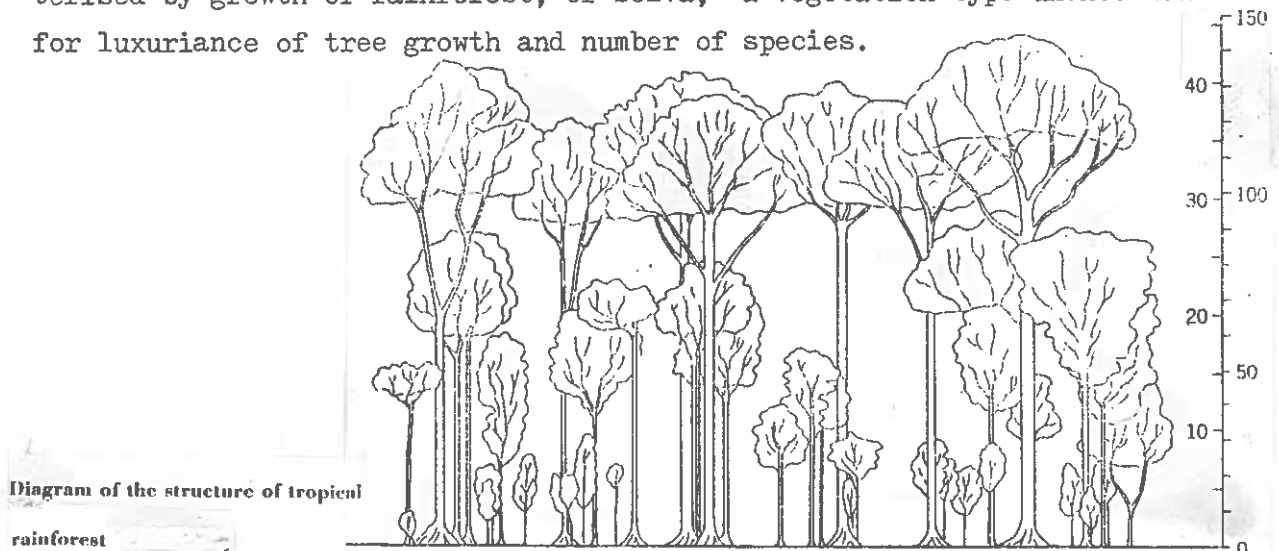
The daily temperature cycle does not vary greatly, nor does the average yearly temperature of 27,3°C (January=26,4°C, September/October=29,5°C). Day and night temperatures show a greater variation - 3°C on the coastal plain and 10°C inland.

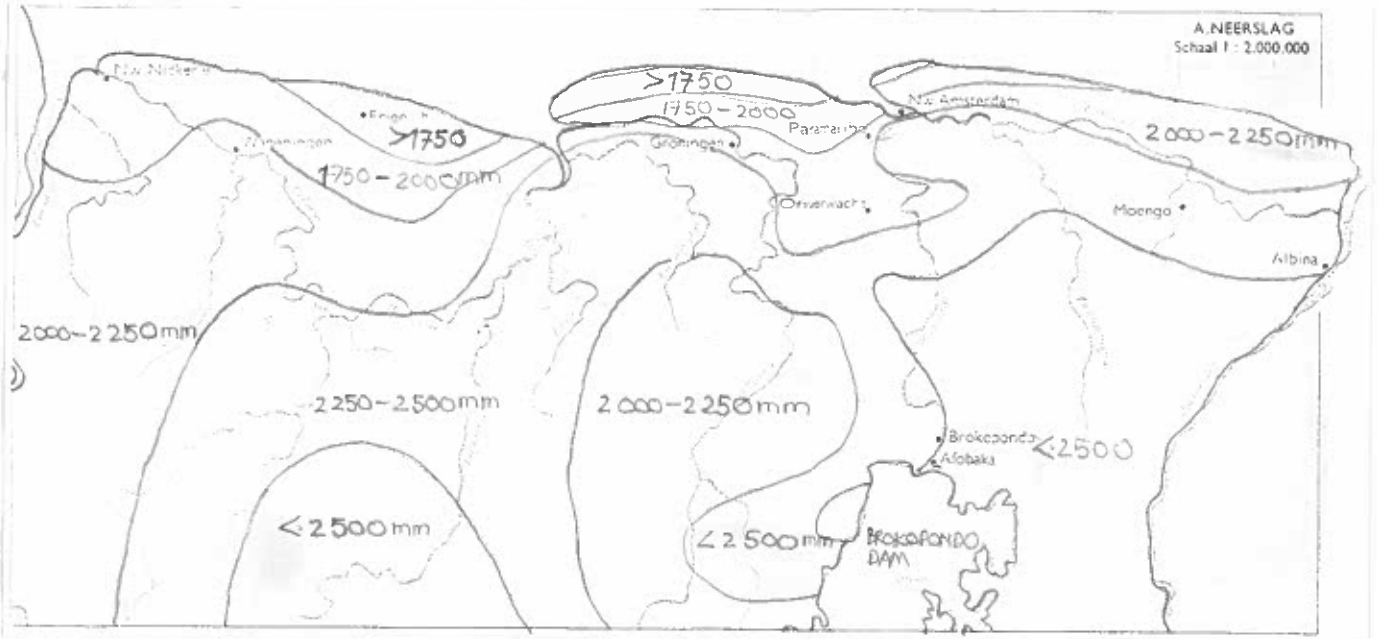
In general Suriname gets little wind, September and April being more windy than other months. Sun angles do not vary greatly during the year, the sun follows a directly overhead path. Sun protection needs to be spread horizontally on all sides of a building for this reason. Thin, upright trees are inadequate for pavement protection, whereas horizontal canopies would provide more or less constant daily shade.

The mean annual rainfall of Suriname is between 2 000 to 2 500 mm. Precipitation generally does not drop below 60 mm per month even in the driest months of September and October. See diagram on the following page.

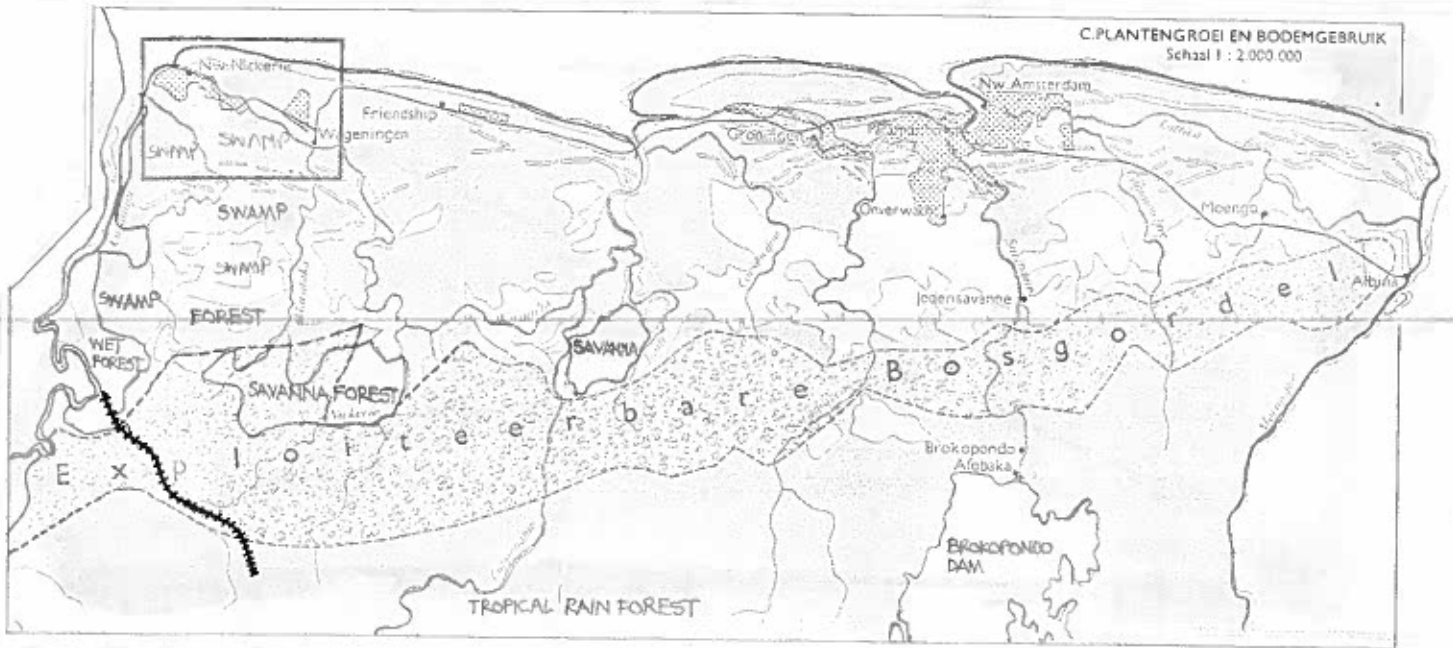
Vegetation

"Because of the abundant rainfall and prevailing warm temperatures, the equatorial region (10° north and south of the equator) is characterised by growth of rainforest, or selva, a vegetation type unexcelled for luxuriance of tree growth and number of species.





RAINFALL PER ANNUM IN SURINAME



VEGETATION IN SURINAME

Source: Grote Bosatlas 1976



FOREST PROFILE OF SURINAMESE FOREST

Source: Encyclopaedia of Suriname 1977

Broad leaf trees (e.g. *Mora excelsa* found in Suriname) rise to heights of 30 to 45 m forming a dense leaf canopy through which little sunlight can reach the ground. Giant lianas (woody vines) hang from the trees. The forest is evergreen although individual species have a rhythm of leaf shedding". Physical Geography (1969).

Epiphytes, plants which are attached to trees and lianas for physical support, are numerous in equatorial rain forests. Examples include ferns, orchids, mosses and lichens. Some epiphytes strangle their host by surrounding it, and may eventually replace it.

As many as 1 300 different tree species may be found in a square kilometer of rain forest. Particular species are widely separated, it being difficult to seek out and transport a desired species from its isolated position. Plant foliage is sparse close to the ground making walking fairly easy. Humus is absent on the soil surface or in the soil profile because of a rapid consumption of dead plant matter by bacterial action, which in turn results from the high mean temperatures and lack of a severe winter season. This condition is typical of the pedogenic process of laterization.

(See 'Soil Structure' for description of this Process).

"Where the forest has been cleared by cutting and burning (as for small plot agriculture or highways) the returning plant growth is low and dense and may be described as jungle. Jungle can consist of a tangled growth of lianas, bamboo scrub, thorny palms, and thickly branching shrubs, constituting an impenetrable barrier to travel". From Physical Geography (1969).

"In a coastal belt of Quaternary and Late Tertiary deposits, ranging in width from 40 km in the east to 100 km in the west, drainage generally is impeded and various hydrophytic vegetation types predominate, as herbaceous swamp and swamp and marsh forest. On some coarse and excessively draining soils a xeromorph (xeric = prevailingly dry) evergreen rain forest develops" J.H. Boerboom at the International Congress of Ecology (1974). See diagram on the previous page.

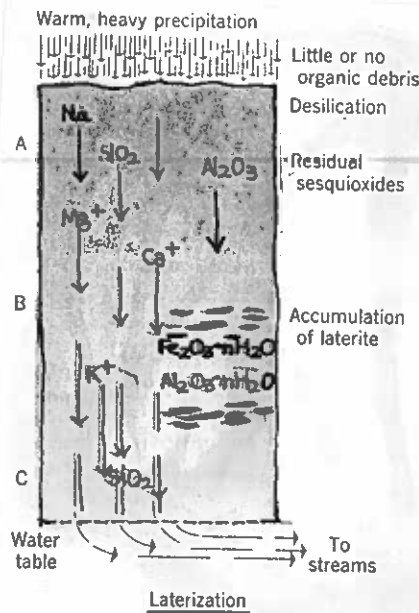
Soil Structure

Wet equatorial regions, such as found in inland Suriname have a distinctive type of soil named Latosols:

This soil type is reddish/yellowish; is especially rich in hydroxides of iron, manganese and aluminium, large layers being termed laterite. Thick layers of bauxite, an ore from which aluminium is extracted, are accumulated as sediments derived from the erosion of lateritic soils of interior uplands (Backhuys mountains, for example).

The pedogenic progress of laterization which is responsible for the soil structure of latosols occurs as follows:

Sustained bacterial action as a result of high equatorial temperatures destroys dead vegetation as rapidly as it is produced. In the absence of humic acids (found in humus) the sesquioxides of aluminium (Al_2O_3) are insoluble and accumulate in the soil as red clays, nodules and rock-like layers (laterite). Silica is leached out of the soil and disposed of by stream flow in the process of desilication. Laterization results in a low soil fertility because bases are not held in the soil and humus is lacking.



source: Physical Geography

Other main types of soils found in West-Suriname include (see regional specific analysis for map).

Sandy Soils characterised by the occurrence of savannas. The soils are whitish, relatively infertile and occur on ridges, watersheds and inland.

Fertile soils found at river/stream estuaries because fertile top-soil was washed down to the lower valleys.

1.2 The Existing Social StructureResumé

A post-colonial polarised structure in which certain basic problems are the order of the day. It should be noted that such problems may be and are found in an under-developed country subject to dynamic social change resulting from dependence on foreign countries. Poverty, emigration, extreme polarization, patronage/ the soft state (i.e. corruption) criminality, innovation against starvation (the extended family system) may be blamed on the internal social structure, but this structure is in effect the logical consequence of great one-sided economic dependence on the industrialised, northern countries. Social problems specific to Suriname may be alleviated by concentrated regional/rural development action.

A Hyper-urbanised Society

As the greater part of the local population is hyper-urbanised for reasons already indicated, there exists a large social class of proto-proletariat in the city, being either marginally employed or unemployed (the street corner society). The question that arises is how these people remain clothed and fed? Two reasons forwarded include the (adapted) extended family structure and the patronage system.

The Adapted Extended Family System

Starvation is kept from the door by a large circle of relatives. If one has been unemployed or not so successful in one's trading during a particular period, one's relatives are relied on for the daily meal. It needn't always be the same relatives who are relied on, as they might also be going through a bad patch.

The food consumed is of the cheapest only and extremely simple, because of the limited budget e.g. a bowl of rice with a small portion of fish is one of the staple family diets. Meat is seldom if ever consumed, and vegetables for the first part of the week only, when the budget is not yet exhausted. Van Waesberge (1976).

The Patronage System

This is a system of mutual favours between a patron and a client. The patron increases his political influence or popularity by rendering services to the client, such as providing him with a temporary job, channeling contracts into certain directions or generally favouring the client using means at his disposal. In this way people who would otherwise be destitute may keep the wolf from the door. The patronage system may be one of the chief reasons why the bureaucracy (government employees) has grown as over-sized as it has - 38% of the working population are employed by the government.

Criminality

Lack of employment and food more often than not lead to diverse illegal practises - 60% of crimes are thefts, 90% of all crimes are committed in the slum areas and the youth criminality is rather high at 70% (van Waesberge 1976).

The Soft State

A soft state has been defined by Myrdal as being 'all forms of lack of social discipline which are forthcoming from: shortcoming in the legal system and the implementation of laws, the general practice that officials in various offices ignore the rules and regulations they receive being in cahoots with powerful persons or groups whose behaviour they are meant to supervise.

Lack of social discipline is evident in diverse forms of political favouritism, including patronage, already mentioned an example being the pandering to the political interest of one's own ethnic group at the cost of other ethnic groups.

"Corruption is fundamentally nothing more than one of the specific manifestations of the soft state", Myrdal.

The Social ClassesThe National Bourgeoisie

Examples of this class include ministers, directors of large companies, top officials, professionals, owners of large businesses/stores.

The Petite Bourgeoisie

This class functions as assistants to the national bourgeoisie, and consists of middle/lower class officials cum bureaucrats cum employers, top-salaried skilled workers (e.g. for Suralco) who form the elite of the working class.

The Urban Proto-Proletariat

Marginally employed and unemployed in the bazaar economy e.g. vendors, marketeers, push cart salesmen and private money lenders.

The (Rural) Proletariat

By definition all labourers who own nothing more than their working ability and are either employed by someone else, or receive a subsistence income (less than \$300 per month).

this is 50% of the Surinamese working population). Examples: small scale farmers employees on large scale farms (sugar cane and banana plantations) and small scale industry.

The divisions between classes are not ethnically reinforced, but mainly the result of extreme differences in income.

Ethnic Groups in Suriname

According to the most recently available census figures of 1971, Suriname has 384 900 inhabitants, consisting of the following ethnic groups:

<u>Ethnic group</u>	<u>Percentage</u>	<u>Absolute</u>
Hindus	36,9	142 300
Creoles	30,8	118 500
Indonesians	15,3	58 900
Forest negroes	10,2	39 500
Indians	2,6	10 200
Chinese	1,6	6 400
Europeans	1,0	4 000
Other (Lebanese, Syrian, Jewish, Portugese)	1,3	<u>5 100</u>
Total	100,0	<u>384 900</u> =====

Source: Algemene Bureau van de Statistiek, 1972, Suriname.

The Encyclopedia of Suriname (1978) provides a more recent population figure for 1973 - 363 504. It may be concluded that this figure has more or less stabilised at \pm 350 000, whereby the ratio of Hindus to Creoles has become 50-50. The Year Plan (1978) is more optimistic and puts the population figure at 379 000 per June 1977. It should be noted that a stereotype characterisation of the ethnic groups e.g. the Creole is a white collar worker, the Hindu a farmer and the Chinaman a shopkeeper doesn't hold true, as it may have done in the past.

The social class structure is not an extension of the ethnic groups, a Hindu national bourgeoisie, petite bourgeoisie and proletariat being in evidence in each group for example.

The Hindus and Chinese play a major role as shopkeepers or small scale entrepreneurs. Generally speaking Creoles have strong representation in the white collar jobs, with relatively more important jobs than the Hindus .

The Javanese are mainly found in the proletariat, but then usually in the lowest strata of this class.

The number of government employees per ethnic group indicate the aforementioned general differences:

	<u>Absolute</u>	<u>Ratio</u>
Creoles	17 508	6
Hindus	3 667	2
Javanese	1 911	1

Source: Kruijer 1977

Three times as many Creoles as Hindus, and six times as many Creoles as Javanese are employed by the government, making the Creoles the predominant ethnic group in government service.

45% of the Hindus work in the agricultural sector, with 44% completing their lower education, as opposed to 60% Creoles.

According to Kruijer (1977) the ethnic group with the lowest income, inadequate education and greatest socio-political isolation relative to other ethnic groups are the Javanese.

Only 8% manage to save (20% of Creoles) and 18% can speak Dutch, which means that very few parents can help their children with their school work. ~~Half of all Javanese residing in Suriname do not have the vote~~ as they are Indonesian citizens. A slight improvement in the position of this ethnic group in the recent past is evident, however.

Age-group Composition

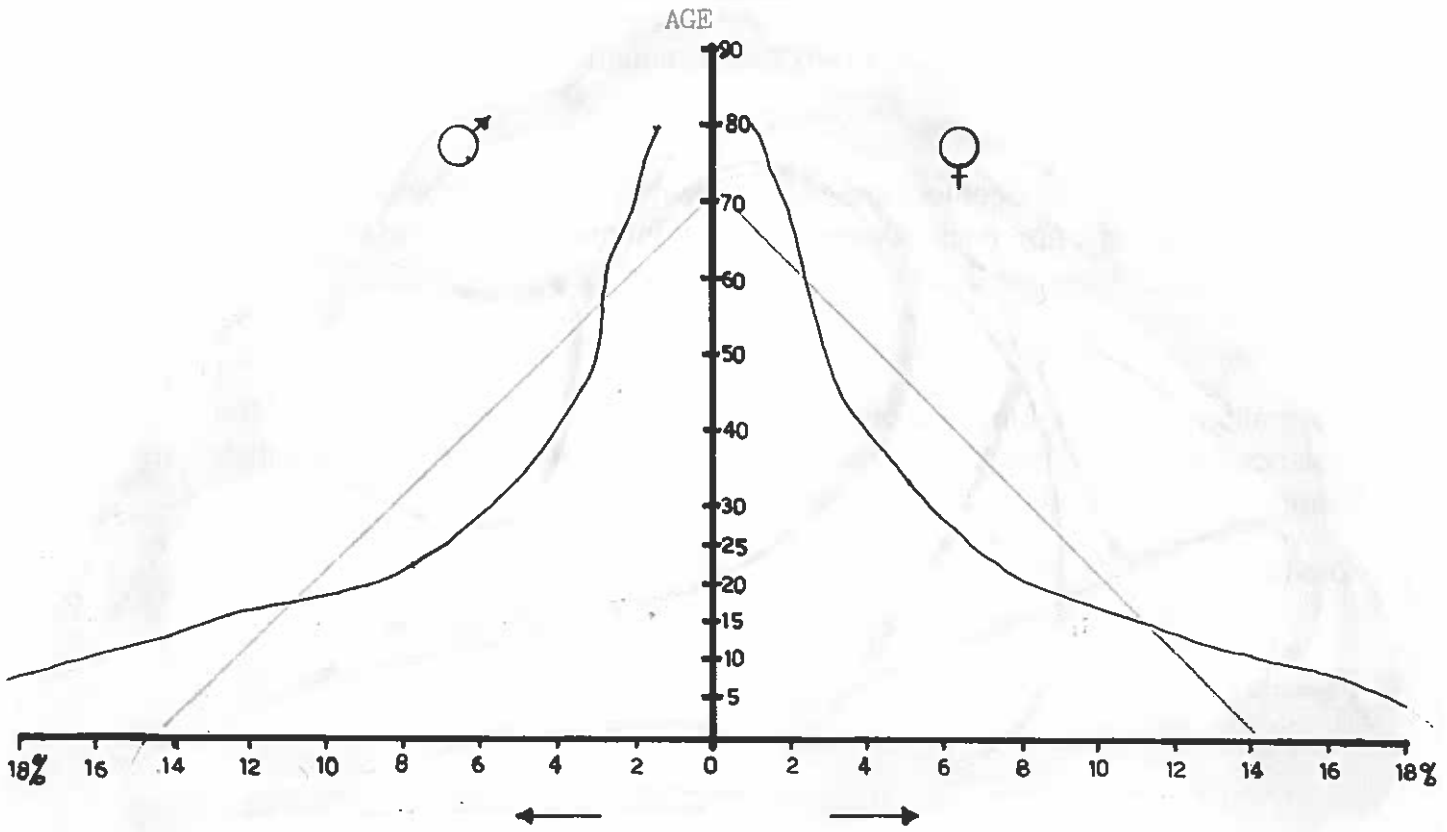
The Year Plan (1978) states that the birth rate is decreasing whilst the death rate remains more or less constant, following a rapid decrease in the '50's mainly because of improved natal care.

	<u>1962</u>	<u>1973</u>
birth rate %	4,87	3,33
death rate %	17,6 (1950)	0,66

The sex ratio of men:women ($\frac{m}{w} \times 100$) is 97, which means that there are slightly more women than men in Suriname. As the birth rate is much higher than industrialised countries, the younger age groups up to 14 years form nearly half of the population:

age \ year group	1971	1977
0-14	48,3 %	45,5 %
15-60	45,6 %	48,8 %
60 +	6,1 %	5,7 %

It is apparent that the age group 15-59 has increased by 3,2% during the above period.



AGE GROUP PYRAMID FOR SURINAME PER 28/2/1971 (National census)

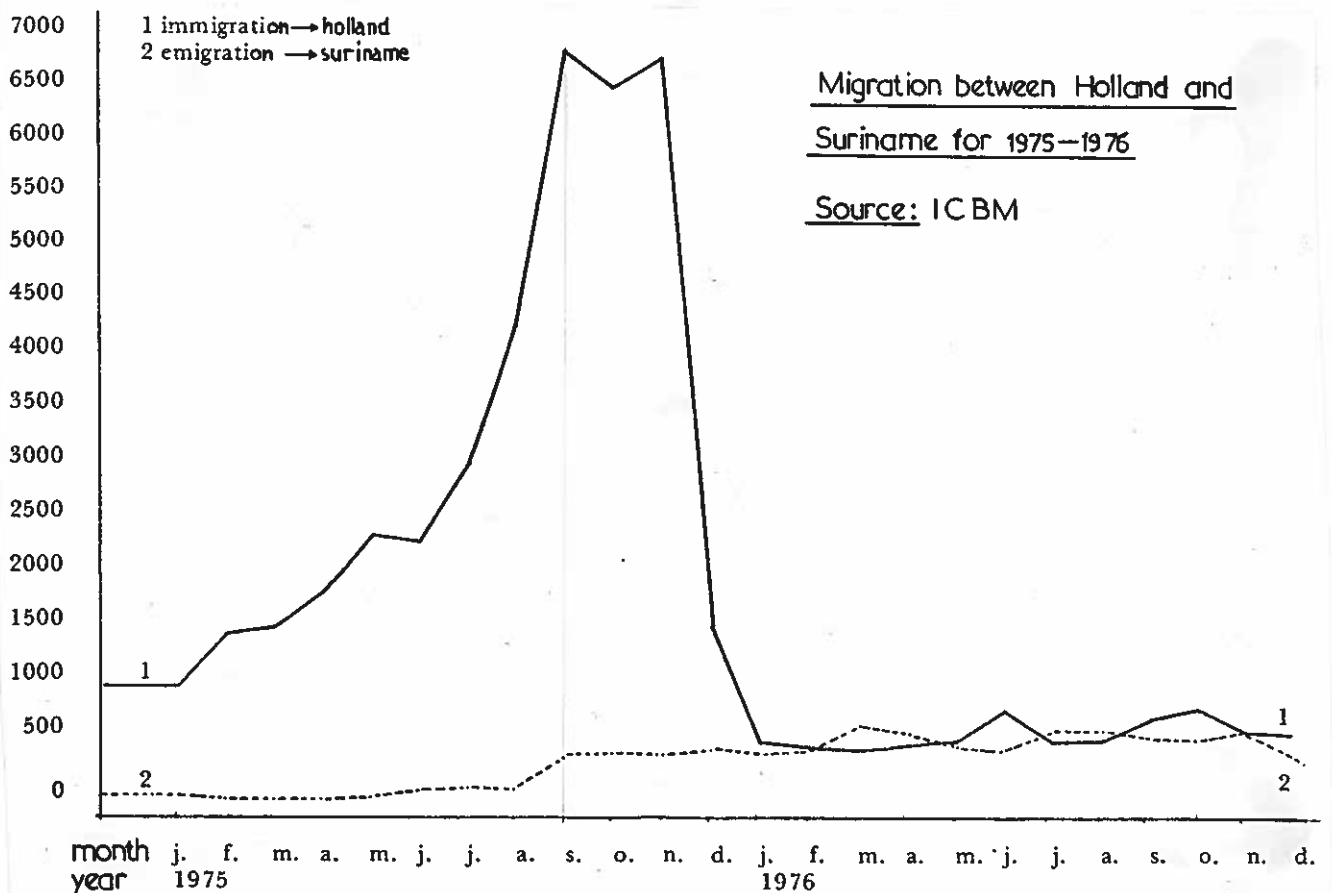
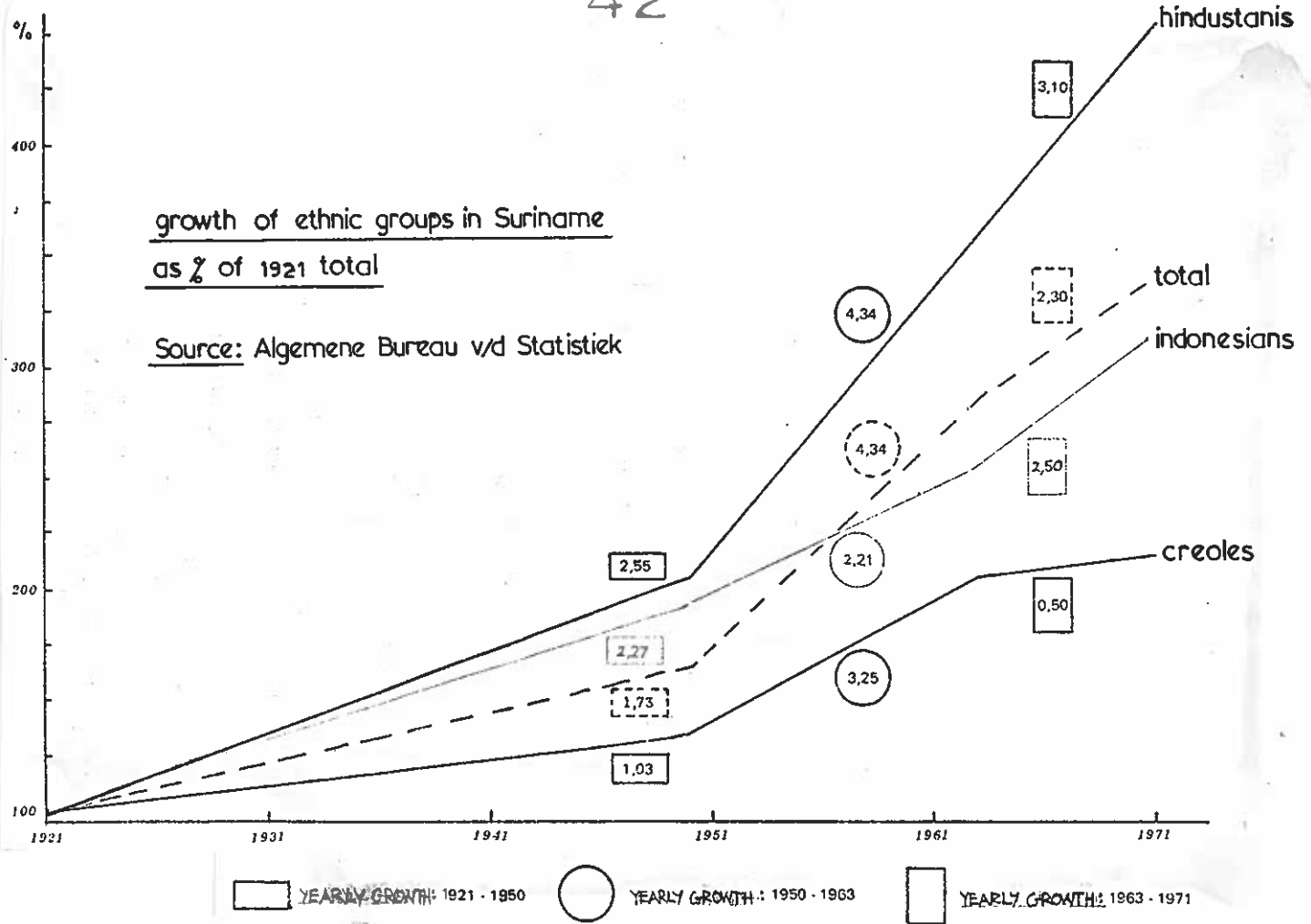
Migration and Re-migration

Since 1973 out-migration effectively doubled every year up to the independence of Suriname (25 November 1975).

year	1)immigration	2)emigration	1) - 2)
1973	6,2	23,7	-17,5
1974	7,9	42,1	-34,2
1975	10,7	80,9	-70,2
1976	14,1	7,2	+ 6,9

In the period up to 1975 as much as four times the natural population growth (accrés) was lost to EMIGRATION. The greatest out-flux was to the large cities of Holland viz. Amsterdam (with 35 000 Surinamese) and Rotterdam. Roughly 25% of the Surinamese population are in other countries.

Foundations such as Tenasu (Terug naar Suriname) in Holland actively promote re-migration, re-migrants possibly playing an active role in the development/modernizing of their country, because of their newly required skills and education, active re-migration policy could benefit development of old or new regions in Suriname.



1.3 Economic ConditionsResumé

Whereas sugar-cane formed the previous mono cultural export product, its place has now been taken by bauxite and alum exports, which constitute 90% of total exports and 30% of the Gross National Product of Suriname. The other sectors are either stagnating (agriculture) or im-productive (government employees) with approximately 50% of the population living under the 300 sf per month subsistence level.

Economic dependence of a country with 90% export of one particular mineral is characterised by:

- dependence/reliance on foreign capital, know how (labour technology) and management for "feasible" exploitation of the mineral.
 - dependence on developments in the world market - buying/selling price changes as regulated by the major concerns.
 - a one sided concentration of efforts on one export sector, other sectors thereby stagnating leads to reliance on other countries for basic goods resulting in increased imports of these goods. In Suriname imports constitute 40% of the Gross National Product, 30% of this being consumption goods - Brandsma (1975).
-
- At the other end of the scale more luxury goods are imported for use by the elite, high wage earners in the mining sector.

The main sectors in the Surinamese economy are discussed with the emphasis on their inherent economic advantages/problems.

Occupational Contrasts

Statistics in the Year Plan (1978) indicate the following regional disequilibrium in average household income for 1976:

<u>Region/Sub-region</u>	<u>Average Household Monthly Income</u>
Paramaribo	361 sf
West Suriname	184
Moengo (Bauxite exploitation)	475
New Nickerie	199
North West (small rice farms).	191

It appears that the amount of income depends strongly on the type of work done, specific types of work being located in certain regions only. The following tabel indicates the number of employees in the various occupational sectors, as well as the gross average salary per sectors.

Occupational Sector	Absolute no. of employees per 1/1/76	As % of the total no. of employees	Gross average salary per month in rank order
Mining & bauxite production	6 900	7,0	1 250
Finance/insurance/stock exchange	1 550	1,6	1 033
Gas, water & electricity	1 100	1,1	800
Transport & communication	2 700	2,7	583
Forestry	1 800	1,8	508
Construction/building	2 200	2,2	384
Industry	6 500	6,7	375
Government service	37 000	38,0	358
Social/community services	6 200	6,4	225
Trade/commerce (import, shop, hotel)	16 000	16,4	150
Agriculture, livestock & fisheries	15 250	15,7	117
TOTAL	97 200	100,0	N.A.

Source: Year Plan 1978.

In general high salaries are paid to few employees; 9,7% of all employed receive more than sf 800 per month, whilst approximately half the employed have a subsistence salary under sf 300.

The agricultural labourers receive the lowest salary (income) of all occupations, their income being less than 1/10 of the mining employees' salary, although there are more than twice as many farmers than miners. The above extremes indicate that the occupational income stratification in Suriname is one of "affluence next to poverty" - Kruijer (1977).

Bauxite Production

Suralco (Surinamese Aluminium Company, 100% daughter of ALCOA) and Billiton (Shell), a Dutch company, have seen to it that Suriname is the third bauxite producing country in the world. Various taxes/levies on the export of Bauxite contribute 30% to the state income according to the Central Bank of Suriname.

At present the mining and production of bauxite is concentrated in the vicinity of Moengo and Paranam, where hydro electric energy from the Brokopondo dam is used to refine bauxite to alumina and then to aluminium.

The mining and production of bauxite involves the following phases in brief:

- a) Dynamiting of the 2-5 m bauxite crust 1/2 m under the rain forest. Blocks are loaded onto trucks and centrally stored from where they are loaded onto trains to Moengo.
- b) Blocks are crushed to pieces smaller than 10 cm. These pieces are dried in ovens. Dried bauxite loses 25% of its weight when in the natural state.
- c) Alumina is obtained from dried bauxite using the Bayer process: alumina crystals are formed in a solution of calcium and natron.
- d) Alumina is dissolved in cryolite solution whereupon a vast amount of electricity is introduced. The electrolysis sets off carbon dioxide and liquid aluminium, this being termed the Hall-Héroult process.
- e) The aluminium obtained is lighter though stronger than steel if worked properly; it is casted/extruded easily and is a good heat conductor.

2,9 million tons of bauxite are refined to \pm 1 1/2 tons alumina at Paranam per year, of which 880 000 tons are exported and 120 000 tons are refined to aluminium. At present the crusher and ovens located at Moengo are working at 40% of their full capacity.

Bauxite Export

Since 1974 export of bauxite has halved itself probably as a result of the added value levies introduced by the government, which greatly increased their profits. Obviously all profits will remain in Suriname should the government choose to nationalise the mining sector.

The government's income from bauxite exports results from:

- Retribution : re-imburement for minerals removed from the soil. (2,6 million sf in 1976).
- Added value: extra levies imposed on the bauxite companies as of 1/1/74 (60,5 million sf in 1976).
- Related activities: income tax, import/export permits, and harbour duties are a few examples.

With so much profit streaming from this one sector, it is to be expected that profit maximization/increase will be sought by the government. The plans for concentration area 3 i.e. West-Suriname (outlined elsewhere) describe the method with which it is hoped to maximize profits obtained from exporting bauxite with the help of the multi-national mining companies.

Joint Ventures

The Suralco-Suriname ' agreement' for the construction of the Brokopondo dam was decidedly in favour of Suralco. In theory a joint-venture favours both parties more equitably; certain loop holes should be guarded against to ensure that both parties receive equal benefit from their enterprise.

Van Waesberge (1976) analyses at some length the joint venture between Bruynzeel, a Dutch timber producing company, and Suriname (p 45-48). He concludes that the joint venture procedure made little difference to the terms of the contract, in which Bruynzeel emerges as the most favoured partner, and Suriname (as with Brokopondo) the dependent partner trying its best to please whilst hoping to attract foreign know how and investments, a hope that is dashed more often than not.

"The influence of foreign countries on Suriname is very great: in 1973 about 20 foreign industries were located in Suriname, which meant that 66% of the total added value in Suriname was in foreign hands - Visser and Wassink (1979)" , quoted from Kutsch Lojenga and Schut (1979). The above figures indicate that, if anything, Suriname should restrict its joint ventures to a minimum, and where possible, decrease the existing number of joint ventures so as to have a greater share in the total added value.

Economic Aspects of the Brokopondo Dam

Following an agreement between Suriname and Suralco, the Brokopondo Hydro Electric Dam was constructed in 1964 by Suralco.

The agreement entailed the following:

- Suriname provides resources, infrastructure, research, up keep and sees to the forced re-settlement of 6 000 forest dwellers
- Suralco builds the power plant, an alumina factory and an aluminium smelter. Suralco receives exemption of import rights during the agreement period up to 2033 A.D. and has right to 90% of the electricity generated by the dam.

Needless to say the above agreement was of little eventual economic benefit to the Surinamese population; being decidedly unfavourable in certain cases.

- only 6% of all electricity generated is transported to Paramaribo, a city in need of electricity to the extent of having to build a new electrical power station.
 - the forced re-settlement of 6 000 inhabitants living where the dam now is, destroyed the social structure and unity of the villagers, who were re-settled in temporary 'trans-migration towns', until they could find themselves a new place to stay.
-
- the Torarica irrigation project below the dam was scrapped because the river's water level was controlable by Suralco alone.
 - the big push policy had a short lived effect:
 - employment increased by an average of 15% from 1964 up to and including 1966, which was the final peak of the parabola. In 1968 the employment increase was zero. This development is explained by the fact that Suralco stopped re-investing its profits in Suriname as of 1967.
- Unfavourable ecological effects of this dam are discussed in 'The Ecosystem'.

Agriculture

The agricultural census (1969) indicated that there were 14 000 farms in Suriname, 12 000 being smaller than 5 ha; an average farm size probably being 2 or 3 ha.

68% of farms larger than 20 ha (or 40 368 ha in total) are owned by Creoles, Surinamese farming companies or Dutch.

The number of farmers shows a steady decrease as a result of migration to the city. This in turn could be the result of increasing hardships in the rural areas (push) and/or the expectation that the city will provide work, a place to stay, many friends and diverse services not found in the rural area (pull).

The Year Plan (1978) indicates that during the period 1/1/74 to 1/1/76 the number of agricultural workers decreased from 16 000 to 15 250, this being a 5% decrease in two years.

The contribution of the agricultural sector to the gross national product was 9% in 1975, the main agricultural products for export purposes being rice, bananas, sugar, fish and of late oil palm is also being cultivated on a large scale.

This Ministry of Agriculture, Livestock and Fisheries have calculated that 18 ha per family is the minimum farm size to ensure full daily employment and a minimum salary. ~~When 160 small scale farms were made available in~~ 1976 at Nickerie, there were 5 000 requests for these farms. Nickerie has 2 600 small scale farms, which seems to indicate that two members of each existing farming family put in requests for a farm. According to van Waesberge (1976) this is a mass indication that the small scale farmers would like to be more productive during the year; their labour being limited by their small farm size.

Trade/Commerce

A 17% contribution to the GNP per 1975. The number of concerns relative to their size varies as follows:

<u>A) Less than 6 employees</u>	<u>B) 6-30 employees</u>	<u>C) More than 30 employees</u>
No of concerns 4 700	240	35
Ratio 134	: 7	: 1

Source: Brandsma (1975).

Categories A) & B) consist mainly of importer/wholesalers with side lines such as ware houses, garages, small factories, restaurants. Category C) consists of retail stores owned by particular families, or one of the few large hotels.

There are several thousand importers in Suriname, with most of them importing a single product brand only.

Prices of goods are relatively high in Suriname as a result of many employees, high import duties and freight costs, scarcity of management and scarcity of credit.

Brandsma (1975) holds trade/commerce responsible for the following vicious circle:

Much import makes establishing and maintenance of local (small) industry unfeasible → bankruptcy of existing industry increases unemployment → absorption of unemployed into the small scale industrial sector is limited/ruled out because no new industries are established the existing ones decreasing in number.

The present commercial structure frustrates efforts at development in other sectors, being one of the largest obstacles to the socio-economic development of Suriname.

Government Service

It provides 38% of all the employment in Suriname which is far and away the largest number in one particular sector. The trend since 1/1/74 indicates that the number of employees has increased the most in this sector (relative to other sectors) with 7 000 employees per 1/1/76. This represents an average increase of 3 500 employees extra per year or 11,6%, statistics being extrapolated from the Year Plan (1978). With such an over-sized bureaucracy it is doubtful whether one may speak of maximum efficiency of employed labour.

Various writers have hinted that government employees are for a large part disguised unemployed:

- Kruijer (1977) - "These disguised unemployed (working for the government) are kept on the pay-roll for social and political reasons, but when considering internal development the salaries paid aren't well spent".
- Brandsma (1975) - "The disguised unemployment (within the government structure) may be put at approximately 50% (16 000 employees) 75% of government service expenditures are spent on salaries".

Forestry

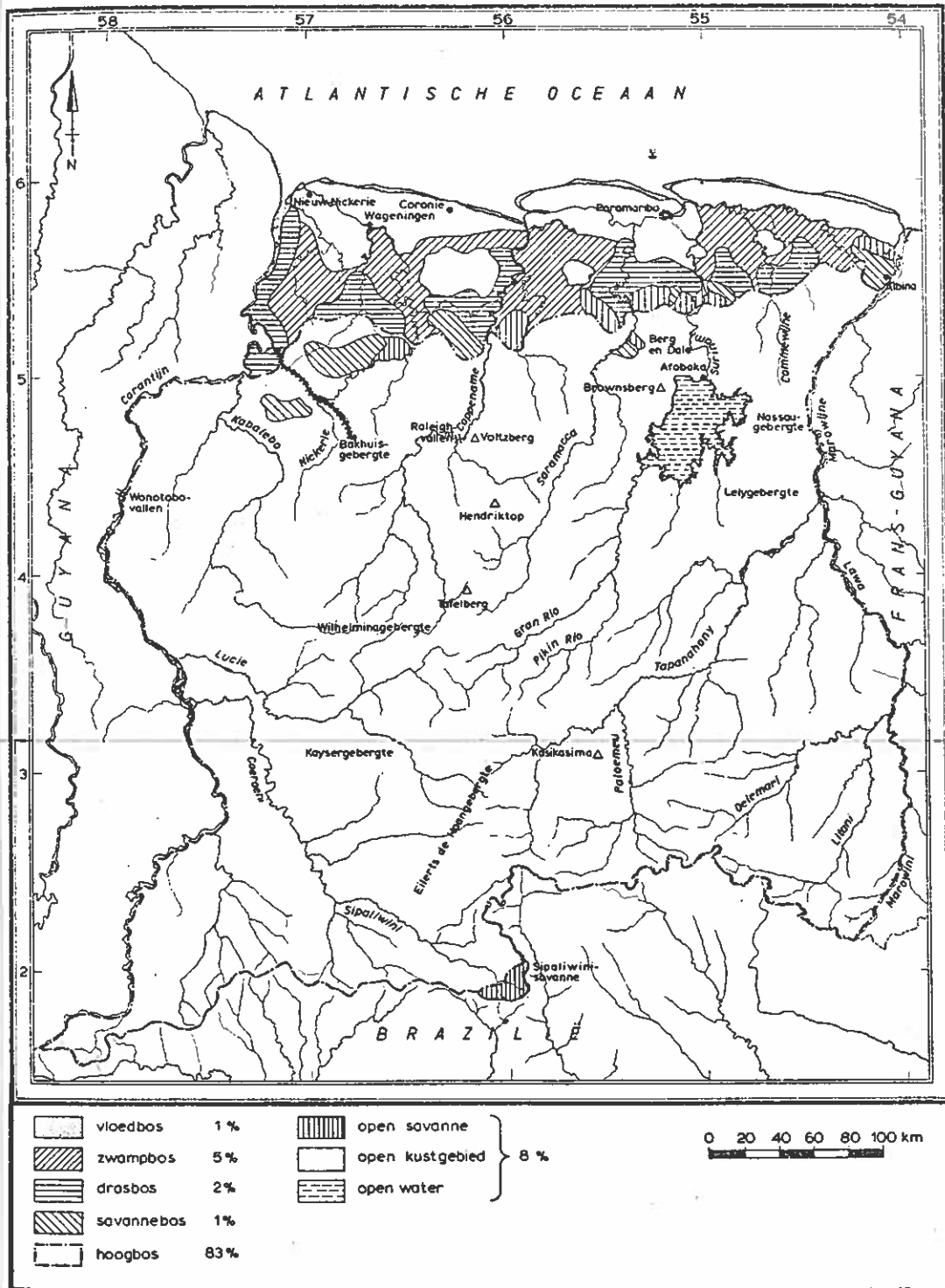
Forestry contributed 2% to the Gross National Product in 1975. The main company is the Dutch-owned Bruynzeel, who chop, saw, make planks/triplex and pre-fabricated timber houses from selected trees in the rain forest. This process has been hailed as "roofbouw" (theft production) by van Waesberge (1976) because forest resources are removed without giving something back to the forest to stabilize it ecologically once more. Besides products directly derived from tropical forest such as timber, charcoal, pulp and chips, the following by-products are provided, Source: Encyclopaedia of Suriname (1977).

- 1) Balata - The milky fluid found in the bark of Bolletri-trees are used as isolation material for underwater cables, for example. At present it is a small scale activity in Suriname, with an export of 27 tons in 1973, but forest dwellers could profit from it.
- 2) Palm Kernels - Increasing demand for vegetable oils encourages the gathering of kernels of palms growing wild, (especially Boegroemaka palm with densities of 200 per ha.).

Fishing

Fishing activity may be sub-divided as follows:

- 1) Upstream and Creek Fishing - mainly by inland Indians and Bush Negroes.
- 2) Fishing in Large Pans - 3-12 men catch fish in small drag nets.
- 3) Swamp Fishing - In the 'dry' season swamp fish species which form main market sales, may be caught subject to a special licence.
- 4) River Fishing - 5-7 men in a 17m boat cast a circular floating net.
- 5) Fishing for Aquariums - An emergent activity for inland regions. Large numbers of small fish are exported to Miami and Germany, but also sold on local markets. Source: Encyclopaedia of Suriname (1977).



Overview of Surinamese Forest Types

Source: Encyclopaedia of Suriname (1977)

1.4 Aspects of the Organizational Structure

Resumé

Legal planning controls, a tool to improved management, are fairly recent, but many plans have been set up in the past to guide Suriname's development. The Second Five Year Plan (1971) mentions the intention for developing West Suriname for the first time: "it may be stated that the industrialization of the West-Suriname region is the only answer to the the structural improvement of the Surinamese economy". This idea to industrialize West Suriname is worked out further in two subsequent plan-reports, viz. 'Mobilizing the Own' and the 'Long Term Development Program', both issued in 1975.

The Relationship Suriname - the Netherlands

The Netherlands made available for a period of 5-10 years a sum of 3 500 million guilders for the realisation of a long term development plan (1975). The sum is divided as follows:

- 1) 2 700 million guilders for the joint financing of development projects and programs which form part of the long term development program of Suriname - for socio-educative development projects, co-financing of development of private organizations, universities and the FMO - Financierings Maatschappij voor Ontwikkelingslanden.
- 2) If the amount of 2 700 million has been spent and the plan has not yet been fully realised the Netherlands is willing to finance the resulting shortage up to a maximum of 300 million guilders on a basis of strict parity with Surinamese economy.
- 3) 500 million guilders are available as security for development loans of development funds and banks in aid of projects forming part of the long term plan. These securities will be taken from development aid granted in the last stage of payment or thereafter.
- 4) In addition to these amounts a remaining 350 million guilders of Dutch aid promised in the past is still available.

Each year Suriname draws up a plan based on the development program and each year makes suggestions for the financing and execution of projects and programs which fall within the framework of Dutch development aid, all within the guidelines of the Surinamese Year Plan.

A joint commission of 3 members of each country (Suriname and the Netherlands) C.O.N.S. advises on the reports published yearly by the Planbureau in connection with the realisation of the program and control of the means.

In December 1976 additional agreements were made by Suriname and the Netherlands: 4 Dutch/Surinamese groups will study the following:

- West Suriname (Werkgroep West-Suriname).
- agriculture, fisheries and industrial production
- public housing
- socio-economic projects.

These work groups consist of Dutch and Surinamese appointed officials as well as experts in the industrial field.

Based on the long term development plan the C.O.N.S. stated that the available finance should be divided in the ratio:

- 50% productive projects
- 25% socio-educative projects
- 25% infrastructural projects.

Thus is concluded that only projects of productive and socio-educative nature will in the near future come into consideration. The latter is ~~necessary to maintain equity between projects - conforming to the above~~ allocative ratio spread evenly over areas of concentration. Furthermore it was concluded that only those private projects which were in accordance with adequate sector plans would be considered, and if they are accompanied by approval of concerned committees.

Planning Departments

In 1973 the organization of planning was legally defined by a planning statute concerning national and regional planning.

The planning departments include:

- 1) Officially - a planbureau, an Interdepartmental Advice Commission for the coordination of development planning (Plan Coordination Commission).
- 2) For outside contact (participation) - an advice committee for Planning and Development in Suriname (Plan Council).

The duty of the planbureau is: research and advice; national and regional development programs and long term plans; prepare, set up and coordinate, execute, evaluate and revise plans/programs; administration and evaluation of development plans in preparation and distribution/control of funds; control/supervision of activities according to conditions of the planning statute.

The duty of the Plan Coordination Commission is: advisory work for the benefit of comprehensivity/goals of development policy.

The Plan Council is: advisory to the minister in national and regional planning.

The National Development Programs: are not blueprint plans but serve as guidelines for lower planning organs/organizations.

The planbureau is administratively equal to the departments of other ministries but they should, in executive work, coordinate with the planbureau. The Bureau for Rural Development, as regional coordinative organ should consult the ministers of Agriculture, Livestock and Fisheries, and Defense and Districts in the design of plans, as the latter are mainly responsible for development of the rural areas.

Cooperatives.

Cooperatives of agriculturalists/water users instituted by the government do not function optimally because of:

- 1) lack of clear cooperative legislation
- 2) lack of systematic/programmed stimulus/guidance from government organizations as well as a low level of involvement and personal interest of government officials.
- 3) ~~the control of the middle-traders on the economic behaviour of~~ the agriculturalist cancels a number of freedoms essential to organization because an alternative to middle-traders such as employees in production and supply is lacking.

Other reasons:

- 1) participation in organization on the basis of motives not consistent with the aims of the organization.
- 2) election of members on political/religious grounds - not competence.
- 3) agriculturalists are not familiar with the functioning of the organization
- 4) members of the cooperative misuse/exploit their position.

Galjaart (1976) made the following comment about cooperatives after his observations in Chile :

In the local communities in which co-operatives and collective farms are set up there are often as yet no norms governing the behaviour to be expected of members of such organizations. The solidarity required of villagers embraces compliance with *existing* norms, and does not take into account all possible or conceivable norms. A modern organization also requires that members observe certain rules governing the division of labour, the distribution of produce and the supervision of the various tasks (see Dore, 1971), rules which either do not exist at all in a traditional society or are differently formulated. It is therefore not as easy to graft a modern co-operative structure upon a tightly knit peasant community as Fals Borda (1970) would seem to suggest.

Challenges

Housing The future housing shortage based on natural population increase is estimated to be 2 000 - 2 600 houses per year. Whereas housing is largely left to the initiative of the private sector at present, direct government involvement (subsidies, construction and management) will be required to eliminate the housing shortage. The production capacity is limited at present, and the construction of houses in West-Suriname is diverting, and will divert, a large amount of production capacity away from already inhabited regions in the rest of Suriname.

Labourers The government has to in some way or another attract labourers to West-Suriname, in which migrant labourers from neighbouring Guyana is seen as a realistic possibility, though unfavourable for Suriname in that savings/wages are deposited in Guyana.

Social Problems There are many social problems and needs which could be improved by better management - many live in slums, have subsistence incomes, are under-employed, have inadequate education and medical care. This forms an urgent problem and requires strategic measures to alleviate it on a broad front. Government goals are however not socially directed at present, but economically directed, a stance which may only prolong and even increase the social misery.

Co-operatives/communes Participation from the bottom up needs to be given a fair chance in Suriname to see if it can work given stimulus/managerial direction.

Import Substitution of basic goods which can be cultivated/produced in Suriname needs to be implemented to save import costs whilst providing work for the many unemployed.

1.5 Existing Plans for Suriname and by Suriname (National Level)

The basis of short term plans in Suriname is formed by two national long term plans which appeared when Suriname became independent in 1975, viz. 'Mobilizing the Own' and the 'Long Term Development Program'.

The main national goal to be strived for is to achieve an economic independence as rapidly as possible. Means to this end mentioned in these plans include:

- Self-reliance, i.e. using the local population and local natural resources - 'Mobilizing the Own'.
- Broaden the mono-culture (bauxite) economic structure
- Import substitution
- Growth of domestic savings
- Creation of employment by means of more labour intensive production/activities.
- A regional spread of economic activities to lessen the spatial / economic over-concentration in Paramaribo (i.e. a growth pole in Apoera)
- The development sequence should be one of: 'first grow economically, then spread socially'. This means that social aspects have to wait until economic growth is achieved before receiving further consideration for planning investment/effort.

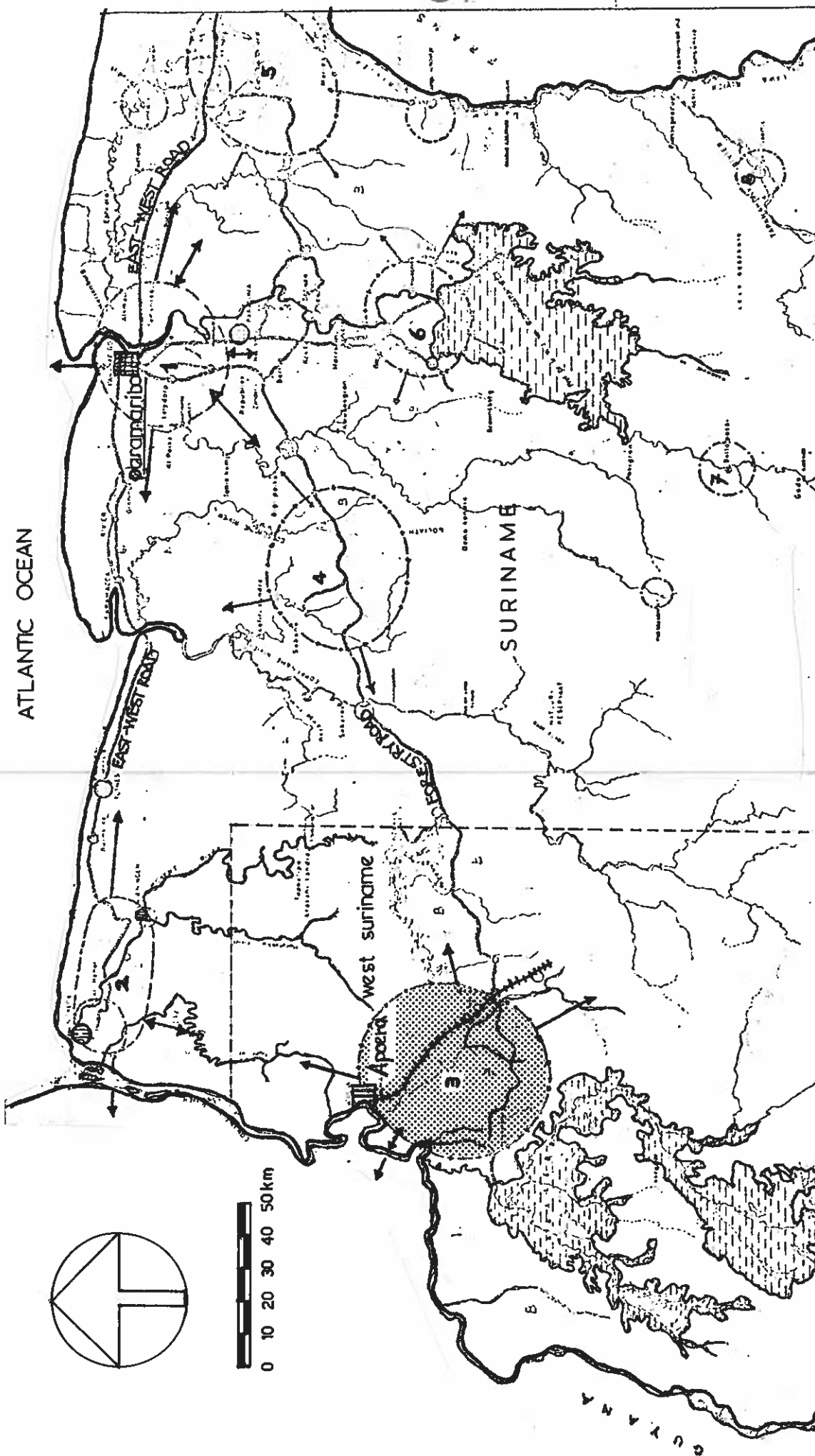
Eight concentration areas are defined by the long term plan, the two most important being firstly Paramaribo and its vicinity, and secondly the region West-Suriname. These two areas will receive the lion's share of efforts and investments, with activities in Paramaribo being mainly directed to the alleviation of existing problems. See map on the following page.

concentration area	Totaal agr. sektor	Bos- bouw	Mijn- bouw	Water- kracht	Industrie	Soc. en kult. voorz.	Infra- strukt.	Beheer + diversen	
1. Paramaribo	160,1	405,0	—	—	22,8 +P.M.	194,0	79,1	—	861,0
2. Nickerie	199,0	—	—	—	P.M.	48,0	53,0	—	300,0
3. Apoera	119,5	132,5	875,1	361,0	P.M.	40,3	219,2	—	1.747,6
4. Tibiti	286,5	60,7	P.M.	—	P.M.	39,0	68,1	—	454,3
5. Moengo	124,0	115,2	P.M.	—	3,5	44,9	15,4	—	303,0
6. Brokopondo	32,1	8,5	P.M.	—	1,0	28,6	10,4	—	80,6
7. Boven Suriname/Saramacca	7,6	—	—	—	—	13,2	27,7	—	48,5
8. Tapanahony	6,2	—	—	—	—	11,2	23,0	—	40,4

Total investments in million Sf for 1974

Source: van Amersfoort 1975

Concentration Areas



Source: Mobilisatie van het Eigene 1975

WEST SURINAME

58

NEW NICKERIE

ATLANTIC OCEAN

"east-west"

WAGENINGEN

CORANTHJN RIVER
CORANTHJN CANAL

WASHABO
APOERA

MATAPI

CAMP 52

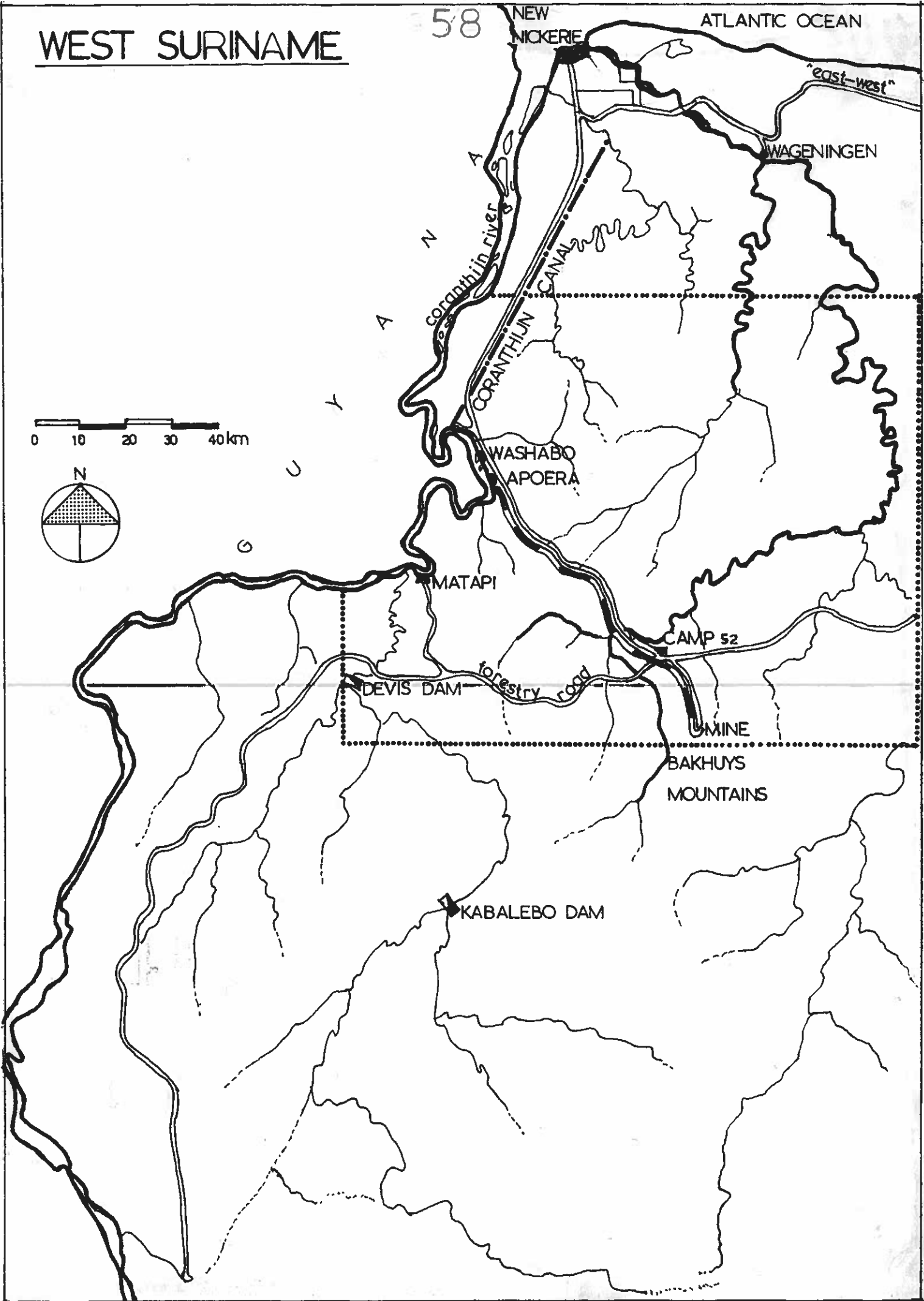
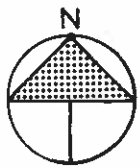
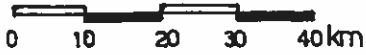
DEVIS DAM

forestry road

MINE

BAKHUYS
MOUNTAINS

KABALEBO DAM



1.6 The Existing Plans for West-Suriname (Regional Level)

Resumé

Of the 4,5 billion sf to be invested in the coming 10 years, 40% is set aside for the development of West-Suriname. This development is based on the mining and production of bauxite ore in the Backhuys mountains, using water and energy from two still to be constructed hydro-electric dams, the Kabalebo and the Devis dam.

A growth pole is planned at Apoera which is a small Indian village with 350 inhabitants at present.

It is hoped that the bauxite industry will form the motor for the development of Apoera as the second largest city in Suriname, with 78 000 inhabitants in 1985. More recent estimations which aren't as optimistic put the figure at 35 000 for 1985.

A railway is under construction to link Apoera, which lies on the banks of the large Coranthijn river, with the mine in the Backhuys mountain 72 km away. Besides having alum industries, Apoera is to function as harbour and as a permanent home for miners, who are staying in Camp 52 at present, a contractor's camp 52 km from Apoera.

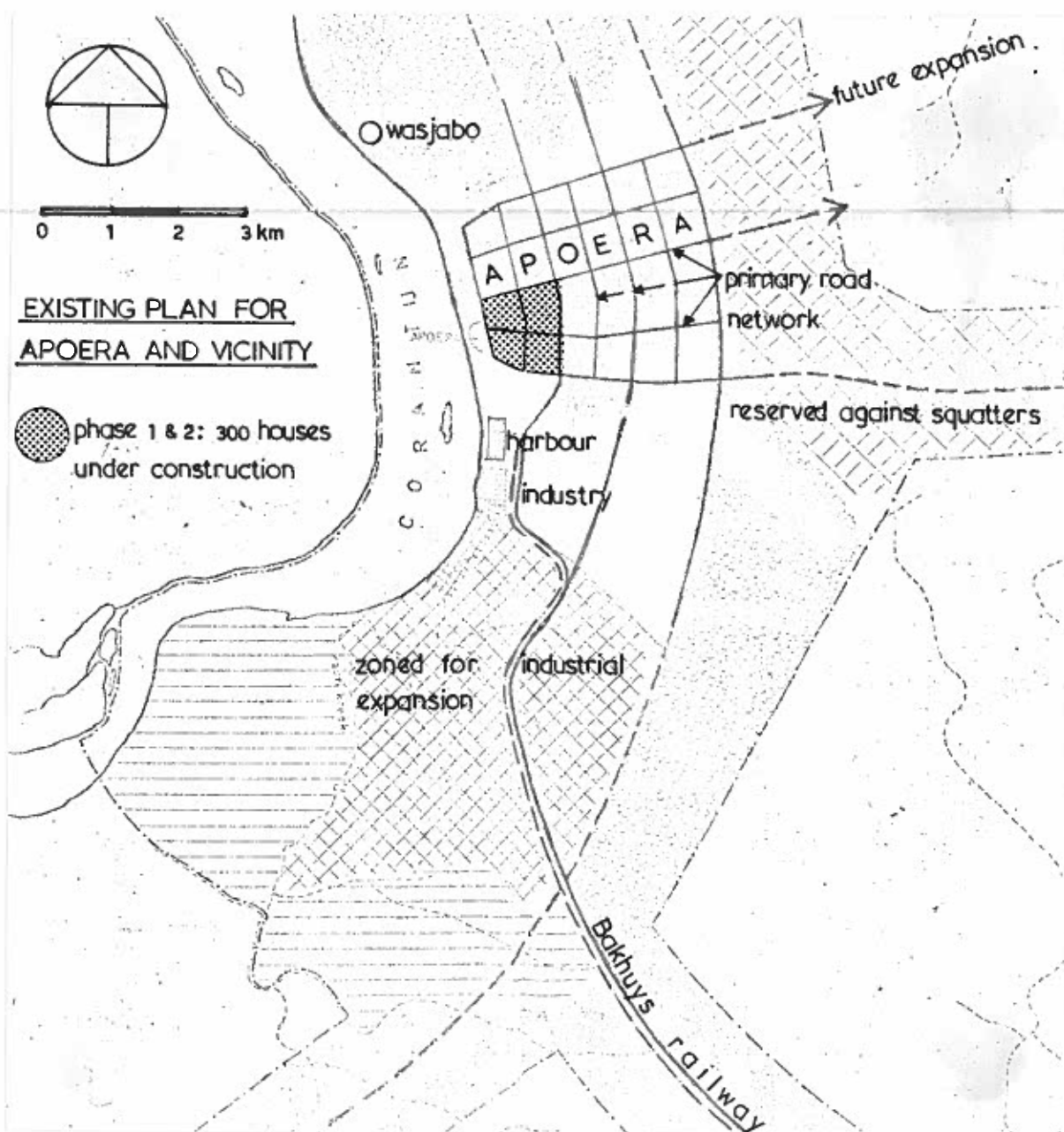
Although eight concentration areas for development have been defined in the whole of Suriname, in the plan 'Mobilization of the Own' (1975), concentration area 3 (West-Suriname) was chosen to become the most important regional/economic area after Paramaribo, it being thought that the combination of bauxite and relatively cheap energy from the dams all in the one region, has potential for great returns on investments. Joint ventures are thought to be a favourable means of maintaining control of profits.

Planned investements for the whole project (railway, Apoera, Kabalebo/Devis dam, mine, harbour) are 1,2 million dollars of which 8% was set aside for the railway.

Critics of this regional plan have indicated that:

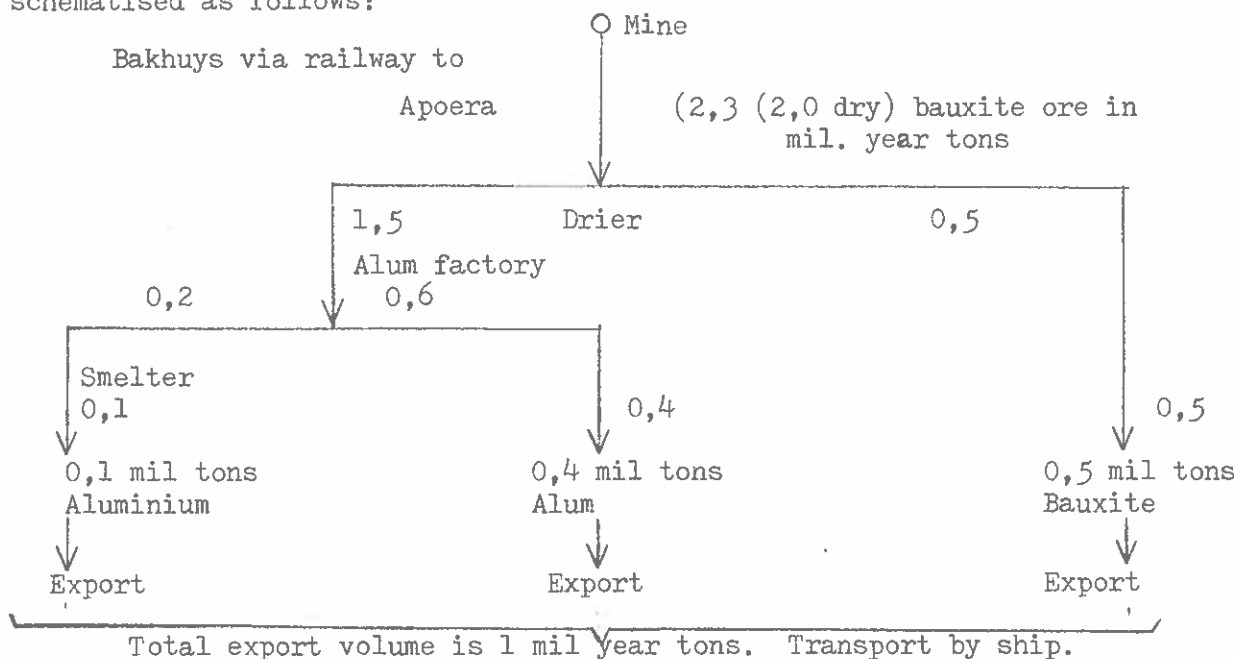
- a city of even 60 000 is unrealistically large when the small size of Suriname is taken into account.
- the railway line is an economic loss, it not being possible to make a profit on bauxite when the cost of the railway is included in the development expenses.

- Labour is absent in the region, which means that labourers from other regions, possibly even Guyana across the Coranthijn river, need to be recruited.
- the land rights of the Indians living at Apoera have been largely ignored, these Indians are forced to forfeit land when Apoera is constructed.
- the bauxite mining industry forms an enclave from which little economic radiation may be expected. Van Waesberge (1976) says of this regional plan, "In short, we are confronted with a second Brokopondo, in which the needs of foreign capital are more important than the needs of the people of Suriname".
- Sedney, a former minister-president, suggests that the resources should be exploited and removed from West-Suriname, and taken to the existing settlements in Suriname. He does not see the need to create a large, expensive growth center at Apoera in the region.



Mining

The planning of the bauxite production in West-Suriname may be schematised as follows:



Plans for the first year of production (1979) envisage a year production of 1 million tons increasing to two million tons in 1980/81. Estimated cost of establishing the mine (with machines, facilities etc.) is 33 million dollars. Number of employees are as follows:

	1) Bakhuys mine	2) Drier	1)+2) Total
1979: 1 mil.tons production	129 men	180 men	309 men
1981: 2 mil.tons production	193 men	227 men	420 men

When the factories, harbour activity and ships at Apoera are taken into account, the total cost of bauxite mining, production and export in West-Suriname is sfl. 442 million with a labour force of 2 158 men.

Bakhuys-Apoera Railway

A 72 km railway with a service road adjacent to it is under construction to transport bauxite ore from the mine in the Bakhuys mountains to the planned factories and harbour at Apoera.

The total number of required railway personell is estimated to be 88 men. The railway, which is a single track with four bypass zones, should be completed in 1979, but a hold-up is the delivery of 150 000 sleepers by American Timber. A hundred meter long steel bridge is to be constructed over the Nickerie river for the railway. Six million m³ of soil had to be moved to ensure a correct grade for the railway track.

Camp 52

Where the forestry road from Paramaribo crosses the railway, a distance of 52 km from Apoera, a contractor's camp with temporary houses has been erected for railway-construction labourers of the Emkay-Suriname Company. **Camp 52 has approx. 600 inhabitants (mining staff and labourers).**

Hydro Electric Power

One of two main reasons for developing West-Suriname (the other being the presence of bauxite) is the possibility of generating hydro electric power. Advantages as outlined in the existing plans include:

- rising cost of oil on the world market makes this form of energy expensive.
- the terrain in West-Suriname is such that two dams, although not very deep, may be constructed. The trees will not be chopped however, and ecological impact of these dams may be said to be decidedly unfavourable (see 'Brokopoondo dam' elsewhere)
- 'Cheap' energy from the dams is much needed for a cheaper production of alum and alumina from bauxite ore.

Norconsult/Electrowatt concluded that the two dams - Devis and Kabalebo - would be economically feasible in their feasibility report of 1975.

Construction of the Devis dam is scheduled to start in March 1979, but this is not probable. The World Bank has shown apprehension in lending money.

The Devis dam

Phase A: The flow of the Sisha stream and Lucy river in South West Suriname is to be diverted into the Kabalebo river to form a dam which can generate 200 MW, the electricity costing 2,5 dollar-cents / KWh.

Phase B: A section of the Corantijn river is to be diverted to the Kabalebo river making the installed productive capacity 300 MW. Suriname has a long standing border conflict with British Guyana in which the Corantijn river is a disputed boundary. This conflict has first to be solved before Suriname has the right to divert the Corantijn river and change the water level. Total productive capacity of the Devis dam, should both phases be completed, will be 500 MW. The total cost of this dam is estimated to be 250 million dollars, the final cost price of the electricity coming to 1,42 dollar-cents /KWh. 1 500 labourers need to be employed for 4,5 years to construct the dam.

The Kabalebo dam

To be constructed at a later date and approximately 50 km upstream from the Devis dam with a planned productive capacity of 300 MW. The cost of the dam is estimated to be sf 300 million.

The monies for these dams has not yet been secured from the World Bank and this, together with the border-conflict, could delay the construction of the dams considerably, thereby jeopardizing the feasibility of the whole West-Suriname development project as planned by the government. 600 labourers are required to construct the Kabalebo dam. When construction is completed 92 permanent employees are required for both dams for service/maintenance purposes.

Apoera

Resumé

Selected mainly for its economic favourability (minimum transport cost of bauxite to a harbour at the Corantijn river), Apoera is planned to become the one and only growth centre and settlement in West-Suriname. Another settlement will be required to house miners at the mine, but the need for such a settlement is overlooked in the existing plans: miners are presumably to commute 72 km from Apoera to the mine and back every day.

Various estimates have been made as to the number of inhabitants in the growth centre - the wide range from 75 000 to 35 000 indicates that great uncertainty exists in this matter.

The Planning Service (Planologische Dienst) has radically altered its predictions - in 1975 it indicated Apoera would have 16 000 inhabitants by 1985; in 1977 its revised estimate was 8 000 by the year 2000. Estimates are based on direct requirements of the bauxite sector and related activities, and not on a feasible centre-size based on the needs, productive capacity, social integration and existing desires of the inhabitants of Suriname. In this regard the legal right of the Indians staying at Apoera has been largely ignored, for example.

Bauxite Production at Apoera

Alum factory - Construction will last 4 - 5 years and will cost 295 million dollars. The number of employees is estimated as being 900; the factory having a productive capacity of 0,6 million tons of Alum.

Aluminium Smelter - will be set into use only if and when the Kabalebo dam is completed. The productive capacity could be 100 000 aluminium tons per year, with a required labour force of ca 750 employees, total cost estimate is 310 million dollars. The production of aluminium at this scale will require large imports of cryolite, fluoride, caustic soda, etc.

CORANTJIN

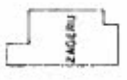


RIVIER

64

MANRIJESSEN

RESERVEBANK



TE

GEBED

HAVENTERREIN

TERREIN

INDUSTRIE

ALCIJKEEN

UITBREIDING

VOOR

MOEDERLIJKE TOEGANG

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Alumina factory

PLANNED HARBOUR AND INDUSTRY LAYOUT AT APOERA

Source: NEDECO & D.H.V. 1975

Harbour facilities - are estimated to cost sf 30 million. The Corantijn river is not very deep and this prohibits the use of large ships. Three small ships (cap. 5 000 tons) costing 6,6 million dollars, will be required if the Corantijn is not dredged.

An ore tanker costing 6 million dollars is to be anchored off New Nickerie to export the ore/alum/aluminium, once over loaded from the 3 smaller ships.

Other Activities in West-Suriname

Agriculture

Two development phases are distinguished in 'Activities in West-Suriname':

1) Short term activity up to 1982: This phase includes farming, vegetable gardening and live stock to supply the region with its daily needs.

Agricultural crop-testing farms are to be set up in this phase to determine the feasibility of various crops.

2) Long term activity from 1982 to 2 000: depends on the results obtained from crop-testing. Possibilities include:

- Oil palm: an . 10 km zone next to the railway is being considered and this enterprise could cost sf 90 million. 10 000 ha is required to benefit from economies of scale, which entails clearing of a large area of rain forest. Another disadvantage is the great distance to Paramaribo, where suitable areas for oil palm cultivation are in any case known to be present. Most of the un-educated labourers at the existing Victoria Plantation are migrant labourers.
- Peanuts: may be possible to cultivate, but other suitable areas also present themselves, e.g. Coebitie.
- Planting of grasses as cattle fodder.

Forestry

98% of Suriname is covered with rain forest which has first to be cleared to make activities, settlements and roads possible.

Charcoal Production 70 000 ha of rain forest has been and is to be cleared for the railway by four clearing units of 160 men each. One unit can clear + 6 ha per day.

It seems certain that the forest where the Devis dam is to be located, will not be exploited beforehand, just as with the Brokopondo dam. The cost of clearing the 100 000 ha is thought to be too great. 1 600 men would have been required for 5 years and 1 250 000 charcoal tons would have been produced.

Timber production Temporary production is the term used for the clearing of rain forest areas for other uses such as agriculture and settlements. Permanent production entails the planting of selected fast-growing tree species in areas already cleared of rain forest. It is economically advisable to combine areas of temporary production with activities such as producing charcoal, pulp and chips from felled trees.

Support Activities

Should Apoera become the home of highly paid miners and factory workers, an immediate requirement is housing, of which the first phase is partially completed. The town plan for Apoera as under construction has 7 dwellings/ha - a density even lower than Paramaribo and decidedly unfavourable for public transport and infrastructural costs. Schools, shops and even a prestige theater are planned; large 60 m green belts (jungle) are interspersed amongst the houses.

A concrete-brick factory has been set up at Wakai (12 km from Apoera), to produce the required paving stones, surface blocks for the new city.

The Indians at Apoera and Vicinity

Recent developments at Apoera have disturbed the life style and land rights of the local Indian inhabitants. They suffered from mal-nutrition when they started to eat tinned foods, their former diet consisting of fresh fish, fruit and crops. The incidence of prostitution is known to be increasing. The former community has become fragmented; some Indians are working in Apoera for a salary, some are going to school now, whilst the rest continue as they did before the development, but their right to ownership of the land they are living on and are cultivating is doubtful. The Pater Ahlbrinck Foundation concerns itself with the needs and rights of the Indians, and tries to prevent a re-currence of the Apoera-Washabo fiasco. WISA (the Work group Indians of South America in Amsterdam) is also acting on behalf of the interests of the Indian minority group in Suriname.

The following description of the Indians' rights is based on an article by E. Nicolas in X min Y Bulletin (1978) which was written after she had travelled through Suriname:

In 1976 the Indian organization KANO organized a protest march from Albina to Paramaribo, a distance of 150 km, to focus attention on the

land rights of the Indians.

From government side a formula of 'dessa'-status has been proposed, which means that a specific Indian community receives a piece of land (not necessarily where they are living at present) and that the town 'elder or captain' allocates plots to members of his community. This formula has been turned down by the Indians as the 'captain' is elected by the government, not by the community.

A land commission Washabo, Apoera and Mid-section has been set up subsequently to the march by the Indians. On July 1, 1978, this commission, and two others for Marowijne and Santigron convened and issued a joint declaration, the declaration of Santigron.

Three demands are made: Source: X min Y Bulletin (1978).

- 1) A legal statute of land rights which corresponds to the legal consciousness of the Indians should be introduced.
- 2) Prohibit all activity which denies recognition of the rights of the forest dwellers.
- 3) Support to development activities which are initiated and desired by the Indian communities is affirmed/demanded by the commission.

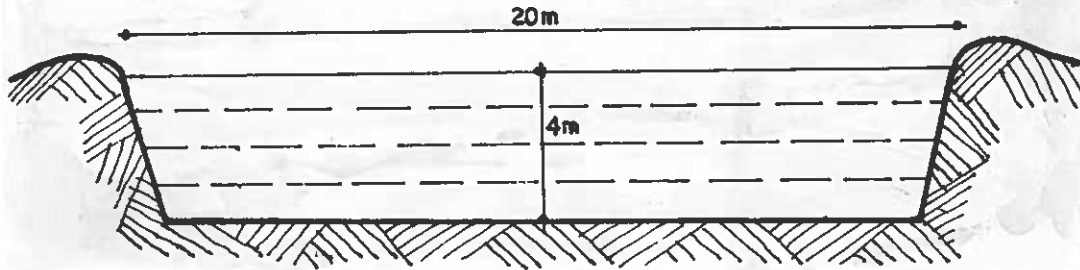
As first action priority the newly set up action committee chose to mobilize public opinion as concerns the demands of the Indians whilst putting pressure on the government at the same time.

Second action priority is to take legal proceedings against the government to put a stop to activities in West Suriname and to alter the plans so that the interests of the Indians at Apoera and Washabo are adequately safeguarded before proceeding with new activities.

An action week Land Rights was organized as of August 13, 1978, in Paramaribo, and drew a few hundred people - which is a lot in Surinamese terms. Most newspapers mentioned this action week, and a radio program was called off because the announcer was advised not to broadcast it by a top government official. It may be concluded from this that the government is giving careful consideration to the protest actions of the Indians.

The Coranthijn Canal

A 75 km canal is under construction from Wakai (12 km downstream from Apoera) to the rice fields at Nickerie. The purpose of the canal is to provide fresh water from the Coranthijn river to 100 000 ha maximum of rice fields located either adjacent to or at the end of the canal. The canal is to be 20 m wide and 4 m deep, with a pump to draw water from the river.



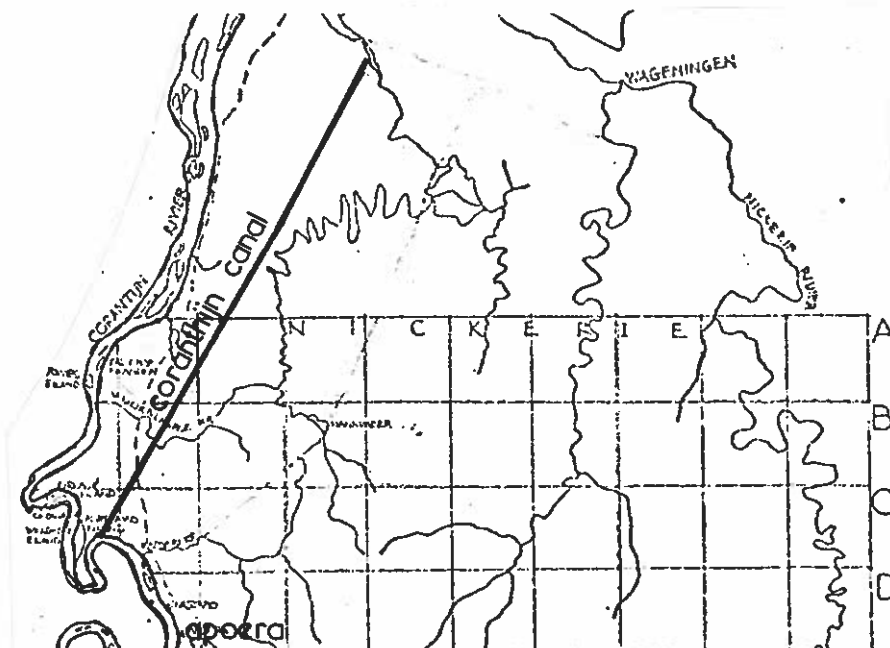
Cross section

A service road to be constructed next to the canal provides a valuable link from Camp 52 and Apoera to New Nickerie as well as the East-West road artery on the coastal plain.

Two problems in the construction of the canal were:

- For the most part the canal is bedded on sandy soil and marsh.
- It lies in an axis which is almost directly into the prevailing wind in West-Suriname

At its soonest, the canal could be completed in 1979. Needless to say its function as fresh water irrigator to the (mainly rice) polders at New Nickerie, will provide a boost to the farming activity there, but also on fertile soils close to the canal further inland.



1.7 Other Regional Plans/Ideas for West-Suriname

Being so capital intensive, the existing development of West-Suriname was bound to raise various comments, bring forth criticisms and opinions. A few of these comments and alternative ideas on development of Suriname are described below, as well as the regional plan proposed by the I.S.P. West-Suriname (1978) of Delft Technische Hogeschool.

Dr. J. Sedney

Dr J. Sedney, former Minister President of Suriname, is the author of a book, 'Growth without Development' and has some interesting ideas on the future of West-Suriname. Natural resources in a region (bauxite, hydro-electricity) are one thing, the creation of a regional city (Apoera) is another. Dr. Sedney proposes that bauxite be exploited in West-Suriname but should be worked/manufactured at Paranam, which has an existing alum/aluminium industrial plant. Only the first phase of the stowage dam plan should be realised (i.e. Devis dam and not the Kabalebo dam) as the second phase affects the river which is a boundary with Guyana.

Electricity should be transported to Paramaribo which needs the electricity, and decentralization should be kept in the management sector. The design and construction of a new city at Apoera demands large extra investments, and Dr. Sedney maintains that it would be more advisable to implement improvements in existing population concentrations than to bring people to an improved, new city.

It is obvious that Dr. Sedney's proposal won't do much for the ecosystem of West-Suriname on the one hand, (bauxite, Devis dam on inundated forest, electric pylons) or to a more equitable spread of inhabitants over all regions in Suriname. On the contrary, his proposal could result in increased urbanization in Paramaribo (more electricity and improved fabric such as houses, social services in Paramaribo) provides potential rural migrants with all the more reason to migrate to the city.

The I.S.P. West-Suriname's Regional Plan - a Variant

The regional plan as proposed by the I.S.P. West-Suriname may be termed a variant as it forms a more comprehensive extension of objectives/activities formulated by existing government plans, and does not propose strong alternatives to the mode of regional development.

Using process and integral planning a balanced development strategy, which seeks a more equitable distribution of efforts/investments over all possible development strategies, was proposed. Self reliance was a main objective i.e. planning and implementation should as far as possible be kept in local hands.

In review, the final proposal of the I.S.P. is one of large scale urbanization in a concentrated development area. Two towns with a minimum of 2 000 inhabitants each are to be constructed at Wakai (the inlet to the Coranthijn canal at the Coranthijn river) and Camp 52 (crossing of railway and forestry road). The latter choice is strange in considering that the terrain is known to be undulating and consequently costly to build on. As with the local government's existing plans, Apoera is to become a regional city with a minimum of 10 000 inhabitants. Productive activities located at the towns and city are:

- Large scale industry : Apoera
- Small scale industry : Apoera, Wakai and Camp 52
- Large scale agriculture: Apoera, Wakai, and Camp 52
- Small scale agriculture: Apoera, Wakai, and Camp 52

Livestock are to be kept mainly at Camp 52, whilst Wakai is to have large scale rice farms.

Various other aspects of the I.S.P. regional plan include:

- integrate the local Indians in the development process
- strong management of development and projects especially in agricultural, forestry and small scale industrial sectors. This is to be achieved by a District Council.
- services should be of high quality
- research into possibilities offered by forestry, agriculture, tourism and small scale industry in West-Suriname should be started soon.
- research into the nature, wishes and needs of the future regional in-migrants.

In their evaluation of their proposed regional plan, the I.S.P. indicate the following uncertainties:

- 1) Is the firm management required for implementation of the plan available in Suriname?
- 2) Are there better regions available in Suriname for specific developments e.g. small scale agriculture and industry, tourism?
- 3) Is the present construction capacity of local contractors so limited that it is monopolized by the proposed regional plan project?
- 5) Do the efforts/investments (money, time and labour) warrant the resulting spread of inhabitants (seen nationally).
- 6) Are not other regions in danger of slumping back considering that all attention (money, time and labour) is focussed on the one region West-Suriname? In this regard the I.S.P.'s proposal would seem to be unfavourable, as it envisages a minimum regional population of 14 000 all in three relatively large urban areas. The cheaper, smaller settlements have been largely negated by this regional plan, the resulting balance of proposed development is heavily loaded on the large scale, capital intensive side, as with the existing plans.

The PALU

PALU stands for the 'Progressieve Arbeiders en Landbouwers Unie' in Dutch, which means the Progressive Labourers and Farmers' Union.

Present policy depends on the faulty assumption that only large foreign companies can develop (modernize) Suriname and that old production areas cannot be developed any more.

"In the development policy of the PALU strong increase of local production-activity is central. This will have to form the base of unemployment elimination and a national system of quality social services. Increase of local national production is to:

- firstly be directed to complete self-sufficiency of basic needs. Unemployment and other problems are solved where they occur. Paramaribo will be cleared up, the interior built up and old districts revived.
- Utilize to the full local know-how and skills so that Surinamese may retain control of development
- recognition of needs and production possibilities which are present in the existing inhabited areas of the country.

Drs. H.E. Chin

In his paper 'Which Economic Development Strategy for Independent Suriname?' (1975 - Beleid en Maatschappij), drs. Chin says the following:

"After independence the emigration of Surinamese to the Netherlands will be blocked, and requests for employment will greatly increase. Only a policy that is aimed at a reasonable quality of life for the broad lowest layer of the inhabitants will be able to counter great social unrest, and racial conflicts, thereby improving the well-being of the Surinamese population and the quality of life in Suriname.

A reasonable quality of life, by which is meant adequate food, clothes, housing, health care and education, is the basic requirement to enable production based on own resources.

"According to a appropriate development strategy new activities in agriculture should occur in small concerns firstly directed towards self-sufficiency and the internal market. Increase in scale and production for foreign markets should occur via co-operatives in the long term. This process includes an important task for the state. Technical aid from international foundations, particularly the F.A.O. and from countries who already have experience in these activities is essential.

"Future expectations with regard to strategic food-types such as rice, edible oils and fats as well as the rising demand for tropical fruits in the rich countries, offer known possibilities.

The creation of adequate-sized cultivated forests which may serve as permanent basis for forest-industry will have to have priority in spite of the high costs.

"As far as mining is concerned, the production of bauxite should be started with first. Suriname has gradually acquired adequate know-how to produce bauxite with a great degree of independence.

"The development strategy outlined above requires large amounts for a big educational program aimed at the production possibilities. This concerns mainly agricultural and technical education. Such an educational program decreases requests for employment especially by young men in which case a directed population-policy is maintained."

Mr H. Rodgers

Mr Rodgers of the Netherlands Economic Institute, is interested in re-migration as means of developing West-Suriname.

In an informal discussion on 8/2/1979, the following comments were made by Mr Rodgers:

- Presentation of activities in West-Suriname to people in Paramaribo (e.g. by television) could stimulate interest and enthusiasm for the developments in that region. At present people know too little about it to concern themselves with it.
- Planning and architectural competitions of new suburbs/buildings in Apoera would heighten interest in the new town. Architect's impressions of new shopping centres/cinema/hospital to be constructed there will help to focus attention and create interest for Apoera.
- Development of Apoera may be given a strong push by the decentralization of government departments to the new town. Government officials may not like it at first, but their presence in Apoera gives a firmer base to activities there.
- Mr Rodgers believes that Apoera offers a favourable alternative to the inland migration trend: If one is a failure in the rural areas, one migrates to Paramaribo, but if one is a failure in Paramaribo, the only possibility is to migrate out of the country. Apoera would offer an alternative inland location to migrants who could not make it in Paramaribo.
- Re-migration directly to the town/city Apoera is a strong possibility. However, Mr Rodgers believes that the chances of an urbanised migrant coming to a small village are slim, the main reason being that the migrant has become accustomed to urban services/facilities and life style.

2.0 Policy Values to Guide Regional Planning Control

2.1 Defining the Regional Planning Task

Introduction

It is apparent from Phase 1 that at present Suriname is a country with basic problems/obstacles to equitable socio-economic development. Phase 2 seeks, as a reaction to these problems, to define what should and could be done to diminish and eliminate the problems, albeit to a certain extent only. This phase attempts to determine in which direction planning activity should be aimed to attempt an elimination of problems on a comprehensive front.

Purpose of the Task

It is hoped that present views and perspectives with regard to the region West-Suriname may be broadened by this planning task, even if readers do not necessarily agree with the proposed development program.

It is also hoped that the poorest social strata may (ultimately) benefit from this planning task. In this context are included the local Indian inhabitants of the region, as well as the poverty stricken and unemployed inhabitants in the rest of the country, a majority group with minority income and participative power.

Lastly recommendations for further research and study could be defined as an (albeit indirect) purpose of the planning task.

Target Groups

Secondary Target Group - planners and policy makers in Suriname as well as (consultant) planners in other countries. It is hoped that through them benefits will accrue to the

Primary Target Group

- all Surinamese, be they in Suriname or in other countries, but especially the present poorest social strata of Suriname.
- the marginally employed and unemployed.

Value of the Report

Hopefully a contribution to the alleviation of poverty in the under-populated regions of tropical lands, and therefore an approach to the problems of underdevelopment - primacy, increasing under-employment, migration to cities, marginal employment, slums, crime and disease arising from rapid urbanization and the irreversible destruction of nature and natural resources.

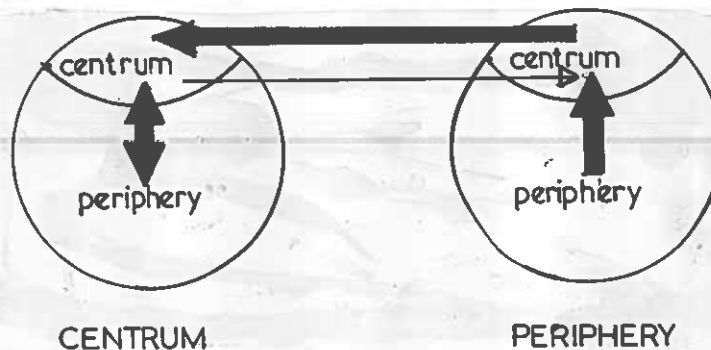
2.2 A Theory of Underdevelopment

Introduction

Having defined the task-purpose and target groups which are central to the planning task in the previous sub-phase, a theoretical view of the problems of underdevelopment could provide the framework for the formulation of policy values to develop nation and region. This theoretical view is provided by theories of underdevelopment, two of which have been selected and presented in this sub-phase.

Centrum-periphery - the theory of Johan Galtung.

Latin-America has not been granted the opportunity of developing autonomously - the so-called developed countries (centrum) have succeeded in dominating and extracting resources from under-developed Latin-America (periphery). Both the centrum and periphery have their (internal) centrum and periphery. In this way the centrum of a developed and the centrum of an underdeveloped country respectively maintain strong links; whilst the local periphery is dominated and dependent on the local centrum.



Galtung has categorised dependency as follows:

Economic dependence - Dependence on economic aid, industrial services/ know-how in exploiting resources.

Political dependence: A hang-over and extension of colonial times, where decisions made in the centrum land are passed on and grafted onto the periphery-land.

Military dependence : Supply of arms and military advisors from the centrum to the periphery. These arms enable the government to remain in power in times of social unrest.

Cultural dependence: Cultural values are transplanted from the centrum onto the periphery by means of education and the media. (T.V., radio, press). One of the results of cultural dependence is the aspiring to the life style and values of the centrum - this could lead to out-migration from periphery to centrum, as well as changed buying habits (luxury goods)

In conclusion , this theory of underdevelopment promulgated by Galtung, is a relationship of countries relative to one another.

Fragmented Modernising - Hinderink

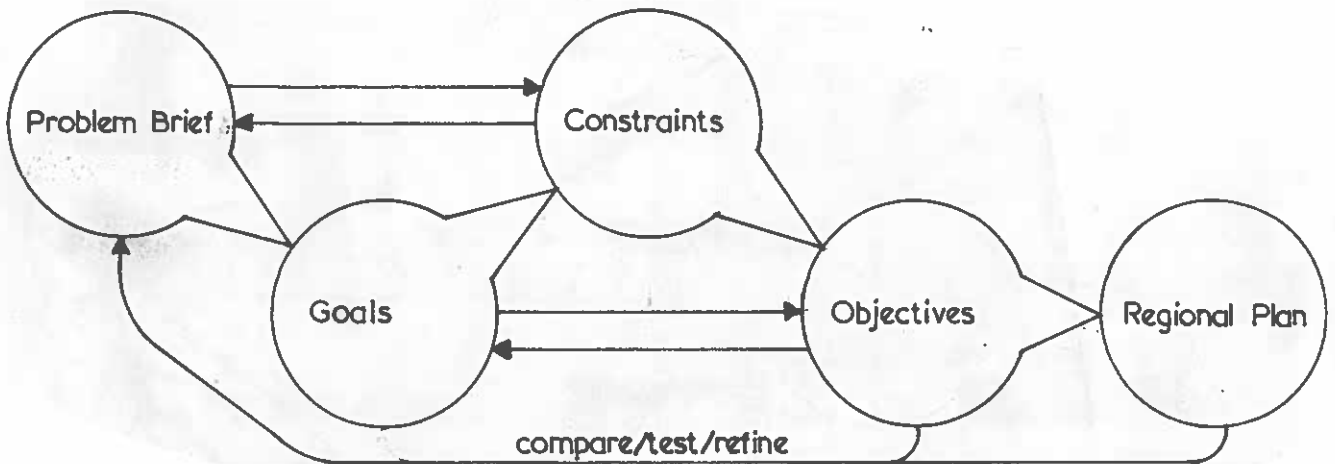
I. Hinderink considers under-development to be a 'dynamic process of fragmented or partial modernising (modernising in Dutch) is a multi-dimensional process which has economic as well as social, political and cultural aspects.

Modernising does not necessarily mean 'Westernising'. Institutional constraints varying from place to place do not slow the modernising process down, but condition the form that modernising takes, the modernising-process thereby becoming fragmented.

Hinderink indicates that fragmented modernising may have as consequences:

- Labour specialization in diverse forms, typical of a scarcity economy (what McGee has called the 'Proto-proletariat').
- A low level of development of the productive force.
- The absence or low efficiency of organised (co-operative) labour.
- A small degree of social mobility resulting in social stratification.
- A high birth rate with a reduced death rate.
- A poor physical infrastructure with an export-orientated 'modern' (industrial or agro-industry) enclave.
- Sharp contrasts between urban and rural areas.

Hinderink states that: ' Disproportional economic division too often leads to social opposites in the cities and the rural areas and an ever-increasing migration stream to the urban centra in the hope of employment '.

2.3 Goals

Goals may be defined as, ' the general directions in which the activity of planning is aimed. The ultimate responsibility for their formulation lies with the decision-takers, they should derive from the values of the individuals and groups who make up society' (N.Lichfield 1975, p. 23).

The following national development goals have been formulated as a result of problems described in Phase 1 of this Report as well as the theory of underdevelopment.

National Spatial Goals

- An equitable distribution of spatial activity over all regions to increase the quality of life.
- Decrease of spatial agglomeration in primate cities/growth poles by means of a balanced spatial decentralization.
- The optimum use of new and existing infrastructure should be determined by a social cost/benefit analysis.
- Use of local technology and materials to realise infrastructure/facility projects. A criterium is: 'as cheap as possible'.
- Protection of the existing nature and ecology, especially the tropical rain forest, this being 'one of the most threatened eco-systems. Per year at least 10 million hectares are destroyed in Latin-America' (REIJ 1977).

National Social Goals

- The diminishing and elimination of social stratification (divide and rule) where possible, to prevent exploitation, patronage, increased unemployment and poverty.

- The seeking of social structures or units appropriate to the Third World context, which provide for the participation of every citizen in the planned regional development.
- The achievement of an equitable social structure deserves priority above economic growth - first provide for the basic needs and quality of life then attempt to increase the Gross National Product.
- Social mobilization (at national level) to further and secure balanced development over all the regions.
- Integration of all inhabitants in the re-distribution of accrued national benefits.

National Economic Goals

- The achieving of a state of economic inter-dependence between nations as opposed to the one sided economic dependence resulting from the centrum-periphery relationship with a fragmented process of modernising as result.
- Reliance on own finance as much as possible to counter economic dependence in the form of loans, external aid and commitments to other countries.
- The 'grab and get out' policy of multi-nationals, be they industrial, agricultural or managerial (consultants, planners) should actively be countered.
- The striving for an increase in (especially productive) employment opportunities, with priority for the social strata living on or under the bread line, and an ordering of minority group privileges.
- The selection of development projects should be based on the available supply of labour within the country.
- Import substitution of basic-need goods deserves priority whilst the dangers of the production of luxury goods or of military equipment under the pretext of import-substitution should be recognised.
- End disequilibrium between supply and demand of labour.

Managerial / Organizational Goals

- The establishing of a clear framework for democratic decision making in which every citizen and group of individuals may be free to determine his or their future for themselves. This inevitably calls for a decentralised, bottom-up participation structure.
- The implementation and stimulation of ends (desired by all) using appropriate means which should be developed within the nation, and not forced on from other nations.

Goals at the Regional Level

Whereas the national goals outlined above encompass the whole nation and all its regions, and even touch on international relationships; the regional goals are concerned with general planning aims at regional level, and consequently encompass the sub-region as well as the relationship of the region with the nation. " Each region is viewed as an 'organic unit' of national development, and hence as a 'specialized unit' within the national life and economy"(Utria in Kuklinsky 1977).

Regional Spatial Goals

- A richly diversified settlement network of small and medium sized self supporting communities in the region as opposed to an infrastructure based solely on a mono-culture export development.
- An efficient internal spatial integration in the region, as well as an efficient integration with surrounding regions and the rest of the under-developed world.
- Stringent legal control on the removal of rain forest in the region to counter soil erosion and maintain the moisture cycle. To this end only small-scale colonization projects and as diverse as possible number of crops should be introduced.

Regional Social Goals

- The development of an educational system which does not benefit the rich and exclude the poor e.g. the income tax of the poor subsidizes the rich who remain in school for a longer period.
- Education should strive for a balance of manual, intellectual and organizational skills such that these may be of ultimate benefit to the regional and national community.
- The elimination of differential access to social services and education based on differences in income, social class, race or creed of the regional inhabitants.
- A social dynamic based on the on-going participation of the people in the planning of their future in the region.

Regional Economic Goals

"Integration into the main stream of national life is both an objective and a means of regional development" (Ruben D. Utria).

- The considered taking advantage of sub-regional and regional opportunity and resources by (many small)changes, each change in turn making further growth possible.

PHASE 2

- The avoidance of mono-cultural economics; economic enclaves; capital-intensive/ labour-extensive development in the region in order that employment may be stimulated, investment risks be reduced and more finance may become available for much needed social projects.
- The establishment of new types of organizations for production (for example co-operatives, communes) to stimulate the economic growth of the region.
- A diverse as possible development to create opportunities for the unemployed.

Regional Organizational Goals

- An autonomous organizational system of innovative and adaptive regional decision taking and decision making.
 - A system capable of social mobilization which is efficient and economical, and allows for participation without prejudice.
 - Co-ordination in policy preparation between the regional level and the national level should be strived for.
-

2.4 Constraints

Introduction

Constraints may be defined as the limitations in relation to the possible courses of action that the (regional) planner might formulate; limitations which ultimately effect the feasibility of specific development strategies. When the general direction of planning activity (goals) has been determined, constraints indicate the main hindrances which stand in the way of the implementation/realisation of these goals. Objectives, being more operational and realistic goals, may be formulated bearing constraints in mind.

International Constraints

Suriname is dependent on foreign countries and forms a periphery to the industrial centrum of the Netherlands and the U.S.A., for example. The main types of dependence found in Suriname are economic, political and cultural, and this one-sided dependence is a constraint to development because:

- control over own resources/production by the people of Suriname is difficult to achieve; this lack of control means that benefits from production are removed from the periphery (Suriname) to the centrum (industrialised north), thereby constantly strengthening the centrum and weakening (sucking dry) the periphery. External aid means external trade, and reduced internal trade for Suriname.
- being dependent Suriname cannot determine the nature of its development projects but is at the mercy of foreign desires, as the foreign lords have the know-how, capital and management which Suriname needs (or thinks she needs) to become industrialised and "modern". This foreign grip keeps Suriname powerless to implement strategies which could lead to inter-dependence.
- the aspirations of the local population are influenced by foreign culture, politics and finance. A life style foreign to Suriname is sought after, creating development vacuums, e.g. people scorn certain necessary tasks because the tasks are thought to be unfashionable, not in accordance with the Northern life style of which they have become aware.
- Political structure may be manipulated by foreigners to suit their wishes, and not the needs of the Surinamese.

International constraints may be alleviated on two fronts:

- a) The Centrum Concern and revised goals in the centrum may alter dependence, trading with instead of 'aiding' the under-developed countries. The centrum may set the pace as it likes and therefore this kind of change seems unlikely.
- b) The periphery The internal dependent structure may initiate small scale self-controlled projects to gradually build up its internal strength and consequently its bargaining power. In this way self-reliance may be achieved without the constant grip of foreign capital, management and know-how.

National Constraints

Spatial

The over-concentration in the primate city Paramaribo constrains the structure of the city (slums, excessive traffic, water removal) as well as constraining rural areas, from which the rural population are 'pulled' to be with their friends in the city.

- Primacy causes the stagnation and depression of rural areas, - an equitable spatial spread over all regions in the country in which rural/regional resources are utilized is therefore hampered.
- Mining towns (e.g. Moengo) function as enclaves and provide little or no socio-economic benefit to the rural population. They too 'pull' the rural population to them. **What happens to exhausted mines?**
- The ecological effects of over-urbanization (pollution, destruction of plant and animal life) as well as hydro-electric dams are unfavourable.

Social

The shortage of social services and housing in the primate city is increased by the in-migration from rural areas/surrounding regions. Aspects such as health care, education, spiritual welfare, adequate employment and housing become neglected in the over-inhabited city. Crime, disease, illiteracy, poverty and misery are the resultant social constraints on national development.

- Existing plans form a constraint to social improvement as they concern themselves mainly with rapid economic gains from large scale projects, whilst the basic needs of 50% of Surinamese remain unanswered. (and unanswerable because no finance is left to fulfill the needs.)

- Social stratification resulting from extreme differences in income, constrains the mobilizing of the whole or a large part of the inhabitants for desired development strategies. Only ad-hoc projects can be realised, a comprehensive development model being impossible to implement in the absence of national social unity.
- The presence of 45% of the population under 15 years of age indicates that the development (education, health care) of this age group is constrained the most when economic and not social priorities are set for development. It should be remembered that this age-group represents the future of Suriname - they should be educated to be the future leaders, craftsmen, teachers, doctors etc. of Suriname. This is not possible if they remain illiterate, unskilled, jack of all trades' migrant labourers as a result of inadequate education and social services.

Economic

- Equitable development is constrained by the one-sided, 90% bauxite export-economy, which increases dependency on export markets, the development of the world bauxite/aluminium sales, foreign technology, investments, imports of luxury goods as well as basic goods.
- Agricultural production is also one-sided in that it consists mainly of large scale production e.g. rice, oil palm and (in the past) sugar cane. The one-sided large scale production impedes small-scale activity, be it agricultural or industrial, as no efforts/ investments are set aside for these sectors, thereby causing their stagnation and ultimate disappearance from the economy. This explains why Suriname's imports consist for 30% of basic consumption goods, most of which can be produced/cultivated on Suriname's abundant fertile soils.
- Although the Brokopondo project did not provide economic spin-offs, existing plans for West-Suriname form a national development constraint, in that they propose to make the same mistake once more, but this time at much greater cost. The vast amounts of money being spent on West-Suriname are much needed for satisfying basic needs, stimulating self-reliance projects which provide local employment opportunities, and improving urban-rural, spatial/social/ economic conditions in already inhabited regions.

- Brandsma (1975) is of the opinion that the present trade/commercial structure forms one of the largest obstacles to economic development, as it impedes the (spontaneous) formation of small scale industries.
- Government service provides 30% of the employment in Suriname, inequitable concentration of labour in one sector being unfavourable to other occupational sectors in that they are left with a shortage of labourers. The Government service is subsidized (by the government) and pulls struggling labourers from the unsubsidized sectors such as farming, small scale industries and home crafts. In this way a productive labour force is gradually turned and constrained into an unproductive labour force; productive sectors constrained into unproductive sectors.

Organizational/Managerial

- Decision taking is done by a select few bureaucrats who form the political top of the government service. A more decentralised democratic decision making process is constrained by, amongst other factors, the large number of government service employees in one primate city, which impedes organization and spread of information within the service and throughout the country.
- Planning is not integrated because of insufficient contact between various departments/services. This once again is the result of an over-sized managerial service which makes efficient creative communication difficult. Plans are at times produced in isolation of other plans whereby possibilities of project co-ordination are lost.
- The functioning of cooperatives is constrained by lack of legislation, subsidies, extension workers and experience for example. Should cooperatives function optimally, the top-down managerial load on the government will be considerably reduced.

Regional Constraints - West-SurinameSpatial

- A constraint to what is considered to be a spatially/ecologically favourable settlement pattern for the region is the large infra-structural projects at present being completed (railway, harbour, roads, Coranthijn canal) or planned (Devis dam, Kabalebo dam, oil palm, urban centre) in the framework of existing plans for West-Suriname. Alternative ideas or plans for West-Suriname have to take account of this spatial activity and its environmental impact. However such alternative plans need not be subordinated to or influenced by the present regional activity, otherwise they cannot be called alternatives, but should rather be termed variants.
- Another spatial constraint is the existing **vegetation** of the region, which needs to be protected as far as possible, not destroyed by resource theft and exploitation. Protection of the regional **vegetation** constrains large scale destruction of rain forest for large scale projects. **Rain forest removal-effects - see 'Settlement Patterns'**.

Social

- The social structure as found in the Indian villages in West-Suriname ~~is being changed and destroyed. Their integration into planned developments is constrained by excluding them from the planning process (of which some have now become the dupe) at the outset. Their sense of responsibility for developments around them is absent and they are even antagonistic towards these developments.~~
- The alleviation of poverty and unemployment in the rest of Suriname is constrained by the highly-skilled capital intensive activities planned for West-Suriname. New labour opportunities are not offered by planned activities for the region. This again forms a constraint to alternative regional developments which must now compete with the salaries/social services/life style offered to the skilled employees. The basis for equitable distribution and minimal social stratification within West-Suriname has therefore already been somewhat undermined.

Economic

- The introduction of new types of organizations for production has not been constrained by developments, as these organizations (if

they have adequate subsidies) may function independently of the regional mining enclave.

- Large investments in the mining sector only constrains the development of other sectors as there is little finance left to stimulate/subsidize diverse projects in these remaining sectors - a factor which in turn constrains the implementation of an alternative regional plan (even a variant regional plan for that matter). However, infrastructure initially constructed for mining purposes could have a dual function in the framework of an alternative regional plan e.g. a hydro electric dam provides electricity for the manufacture of aluminium, but may also be used to irrigate agricultural land and/or provide recreational facilities for tourists if properly constructed.

Managerial/Organizational

- As no managerial structure exists at regional level at present (a structure which is necessary to ensure efficient, decentralised decision making) one cannot speak of regional managerial constraints. These constraints are located at the national, centralised managerial level, and include problems of project integration in the course of the implementation of the existing plans.
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2.5 Formulation of Regional Objectives - West-Suriname

An objective may be defined as locational specific planning aims which relate to specific problems of the (regional) study area. An objective is derived from empirical studies of problems and/or a consideration of constraints which result in turn from initial goals. Objectives may be termed operational goals in that they are a realistic translation to a specific region of the goals. The objectives which follow are grouped under headings which fall under a specific decision area category.

Spatial Objectives

Settlements

- 1) Existing settlements in the region may not be encroached on or affected by new structures, be they industrial, agricultural or infra-structural
 → min. of 5 km buffer zones where possible, to avoid dominance.
- 2) New settlements should be located in environmentally favourable sites as regards drainage, transport/communication, climate and soil structure
 → see results of P.S.A. and Threshold Analysis.
- 3) Dwellings should first and foremost be in accordance with a (minimum) standard of safety (fire, collapse) hygiene (ventilation, sun penetration, waste removal) and habitability (ceiling height and room sizes)
 → see architect's building laws.

Secondly dwelling plans and settlement lay-out should correspond with the life style of the Surinamese → empirical architectural study.

- 4) Commuting should be internalised in settlements to avoid 'dormitory settlements'. Travelling times (walk, bus, tram or car) should be minimalised where possible. To this end nuisance free small scale activities may be integrated in the settlement structure.
- 5) Services and facilities in a settlement should be within easy daily reach to all inhabitants of the settlement → rayons have been established by the Planning Service and the I.S.P.
- 6) An efficient public transport system corresponding to specific settlement size and needs of the inhabitants is essential for the functioning of the settlement. More than 50% of the present Surinamese population are of school-going age, which justifies the creation of a 'school' transport system → see I.S.P. calculations on the school going age group ratio.

- 7) Traffic nuisance (pollution, noise, danger) should be minimalised by creating traffic free zones in dwelling areas as far as possible. Long one-way roads should be avoided as they encourage speeding. Pedestrian movement deserves priority within the settlement. → see Alexander's Housing Project for the Barriadas in Lima, Peru.
- 8) Industrial production nuisance (pollution, noise, explosion-danger, mine dumps) should be eliminated from settlements; and where this production destroys vegetation, eliminated from the region if possible → distances from settlements depend on the specific type of industry.

Forestry (Landscape)

- 9) Systematic elimination of specific rain forest species (e.g. mora excelsa) should be guarded against. 'Taking' should at all times be accompanied by 'giving back', planting of similar trees as removed to avoid soil erosion and maintain the structure of the rain forest if possible.

Agriculture (Landscape)

- 10) The removal of large areas of rain forest for agricultural purposes means the permanent destruction of that area of rain forest and should be avoided → studies on min. feasible farm size/optimal layout required.
- 11) Pollution of water by industry, insecticide/plant killer sprays and rotting plant matter should be avoided to encourage fish-life and secure suitable water for domestic use/irrigation for the entire region → control on the construction of the Devis and Kabalebo dams, removing as much forest beforehand as possible.

Social Objectives

Settlements

- 1) Social integration and participation of local inhabitants with regard to regional development activities is a requirement to avoid exploitation of any one social strata → a democratic planning system.
- 2) Social or ethnic stratification which may result from extreme income differences should be avoided/minimalised - "The rich get richer and the poor get poorer"(and are powerless to do anything about it). Such stratification finds its spatial translation in prestige dwellings for mining employees in one suburb or settlement and sub-economic dwellings for small scale private traders in another → laws and zoning.
- 3) As the number of inhabitants per settlement increases, so the social services and facilities should be expanded to maintain good educational

health care, communal and recreational services → see rayons and population thresholds of the Planning Service and the I.S.P.

Agriculture - Industry

- 4) A social structure which does not scorn but recognises the advantages of small scale activities should be encouraged → work alienation resulting from depersonalization, discouragement of individual creativity and large scale production should be avoided by making use of 'in-between' technology.

Economic Objectives

Settlements

- 1) Investment risk and waste should be kept at a premium, however the quality of the built environment may not be affected as a result.
- 2) Basic social services (schools, hospital, creche and natal care) should receive financial priority above luxury services (theater, restaurant, sport hall and hotel) → adjustment of the dividing ratio of government expenditure.

Industry

- 3) The presence of large scale mining activity in the region seems unavoidable, so that an objective may be formulated to the effect that the entire production/manufacturing process of Bakhuy's bauxite ore to aluminium (finished product) should occur either in the region or in Suriname to keep the greater value profits which result from final production stages in the country. Recently Third World countries are increasingly turning to complete production before export, causing marked economic loss to the industrialised countries.
- 4) As an investment risk-check to bauxite production a diverse number of alternative industries as feasible should be encouraged/developed in the region thereby forming a firm, integrated economic base from which the inhabitants may benefit.
- 5) The feasibility of development projects should be determined before investing; in this way non-profitability of projects (e.g. railway Apoera - Bakhuy's mine) may be minimalised, such losses being ultimately carried by the Surinamese people → feasibility study of all projects.

Forestry

- 6) Production within the region should firstly fulfill regional needs (houses, bridges, furniture, playgrounds) secondly national needs and lastly export. Production to finished products should be encouraged.

Agriculture

- 7) The cultivation of crops, market gardens, live stock and fishing should be aimed at regional self-sufficiency firstly, import substitution for Suriname secondly, and export (of certain products only) thirdly —→ realistic estimates of food amounts required have been made by ILACO in their 'Long Term Integral Agricultural Development Plan', (MIAOP) of 1977; and PROSUR in their report 'Agricultural Development Possibilities in West-Suriname', 1977.

Managerial/Organizational ObjectivesSettlements

- 1) The right of land retention of autochtone regional inhabitants should be respected. To ensure optimal integration, a bottom up planning participation system could be introduced.
- 2) New organization types (cooperatives, communes) should be turned to to alleviate managerial burdens and encourage the settlement of suitable, allocated regional land by Surinamese.
- 3) Housing- shortages of sub-economic and economic type should be anticipated for and alleviated by the state —→ legal measures should guard against monopolies of the regional housing industry by any one construction or sales company/agency which could lead to price fixing and sub-standard dwelling quality.
- 4) A regional organizational body is essential to ensure efficient and equitable distribution of development effort/investment as well as participation in the making of decisions ultimately affecting the regional inhabitants, industry/ agriculture, construction of new settlements and efficiency of cooperatives/communes.

Objective Achievement Priority

The creation of basic organizational units which are both self-sufficient and produce for the needs of others is the main objective achievement priority. Such units would ultimately be economically and managerially independent when functioning integrally in the regions amongst the unemployed and broad layer with sub-sistence incomes. The formation of the units (cooperatives, communes) is encouraged in existing inhabited regions of Suriname. Information spread, guidance, subsidies and legal control form the basis of this encouragement which is the government/regional authorities' responsibility.

The re-alignment in objective-priority does not affect the existing activities in any way, as the mining activities form an enclave for the most part. However, the sooner this objective-priority is initiated, the sooner a firm spatial, social, economic and managerial foundation for regional development may be created.

The main objective achievement priority as outlined above contains the following two priorities:

- 1) First provide the basic needs (housing, health care, education, food electricity) then a quality of life (recreation, sport, communal centres) within each organizational unit. A subsidy phase aimed at providing the basic needs ends when the unit is fully productive. A unit may determine the standard of its quality of life (and provide the necessary facilities) as it chooses.
- 2) Full employment of all work-seekers/those capable of work is a priority both within the organizational unit (in which employment-développement is easily monitored) and in other employment sectors in the region. As a necessary counter to the large mining enclave, employment should be created in a diversity of small-scale sectors to 'pull' as many unemployed as possible from existing regions.

PHASE 3,4,5

3,4,5 The Analysis of a Theoretical Regional Development Model

Definition:

A development model consists of a typology of development strategies as well as regional settlement patterns (so-called spatial stereotypes) and their (optimal) combination. See illustration on the following page.

Goal

The consequences and affects of development strategies within a particular development model are determined and evaluated within four main categories of decision areas of planning - viz. the spatial, social, economic and managerial decision areas categories. Evaluation is effected using goals, objectives, feasibility and constraints as testing criteria. The goal is to arrive at priorities for regional development based on the selection of a development model.

How Used in Development of the Regional Plan.

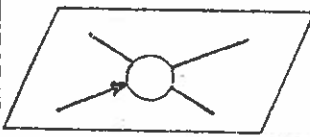
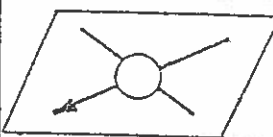
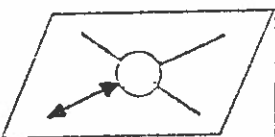
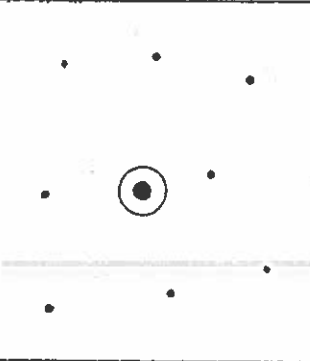
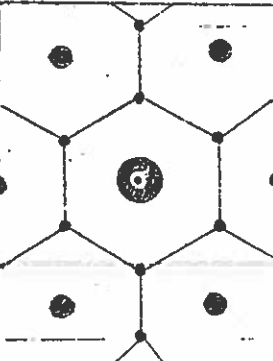
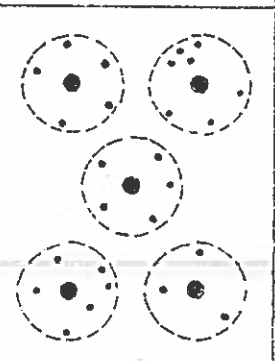
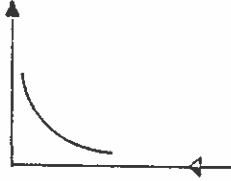
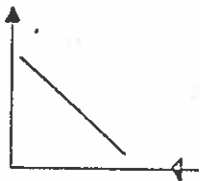
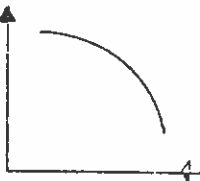




Alternative development models, each consisting of its particular package of development strategies, are short-listed using strategic choice between the consequences and effects pertaining to the decision areas. Each model in the short list is then integrated with the resources/potentials/ecology of the region. From this emerges a ~~program for development and a regional settlement plan after selection of the preferred developmental model.~~

The Phases

Firstly, possible development strategies are considered for a tropical underpopulated, rich in (bauxite) resources (such as West Suriname), region in the Third World. There are two thinking processes at work:

- the divergent process: as many development strategies for this type of region as possible are broadly evaluated to gain an idea of the feasible options within the constraints and the stated objectives. The source for this study is available literature with regard to the (under) development of third world tropical lands. Case studies of existing studies are looked at to 'learn from mistakes'.

- the convergent process: Using the (more detailed and operational) objectives as a policy guide; the development constraints and feasibility; a regional development program is formulated based on strategic choice between (regional) decision areas.

Compare Development strategies	Development	Economic growth	Distribution	Ecology
	Development goals	Increase in G.N.P.	Social equality	Sustainment of eco-systems
	Development efforts	Concentrated	Decentralised	Self-reliance
	Development effects	Growth before distribution	Distribution before growth	Growth with distribution
		Urban-rural disparities	Urban-rural conflicts	Urban-rural balance
	Development flows			
Compare settlement patterns	Settlement patterns and hierarchy			
	Settlement distribution	 Primacy	 Rank-size	 Balance
	Predominant type of rural centre	INDOVILLE 	DISTROVILLE 	COMMOVILLE 
		AGROVILLE 		

Source: Rural Centre Planning 1978.

Legend

- Indoville and/or agroville = single city
- Distroville = rural services centre
- Commoville = village and/or commune.

3.0 The Development Strategies Approach - an Introduction

Development strategies may be defined as the motive forces which cause activities to increase or grow within a region. Growth may take many forms: towards dependence or independence; balanced or unbalanced, centralised or decentralised, rapid or slow, capital intensive or extensive and so on.

Growth may result from four propulsive sectors, viz.:

- large scale industry, abbreviated as LSI.
- small scale industry, abbreviated as SSI.
- large scale agriculture, abbreviated as LSA.
- small scale agriculture, abbreviated as SSA.

Although somewhat simplified and generalised, the 'big four' do not cover all the factors which may contribute to the growth of a region. Factors such as the following also spring to mind:

- innovation and discovery of new cheaper manufacturing modes.
- introduction of new (improved) organization, such as co-operatives into the region.
- planned and un-planned spin-off effects of a specific propulsive activity.
- improved skills and production as a result of education, research stations, market research and improved communication.
- profits gleaned from sub- and inter-regional trade as well as from tourism.

In general, however, the above activities cannot be said to be inherently propulsive. They tend to result from or rely on a propulsive activity and function as either a support or spin off of that activity.

Returning to the four propulsive sectors, it should be noted that a definition of the terms used should be treated with caution: what may be thought of as being small scale production in one country may be regarded as large scale in another. Bearing this problem of relativity of scale in mind definitions have been formulated as follows:

Large scale: that which consists of a relatively large number of measurable units.

Small scale: that (production) which consists of a relatively small or limited number of measurable units.

Measurable units could be one or all of the following - investment, labour (skilled or unskilled), infrastructure, and resources.

Industry: the changing of the value of a primary product by means of machine, human labour or trade.

Agriculture: the cultivation of the ground and animals i.e. - the utilizing soil and biological processes to enrich natural or animal products for human use.

3.1 The Divergent Analysis (and Synthesis)

As indicated above, the divergent process seeks to analyse a wide range of development strategies to attempt the selection of options in a logical and rational way, The strategic choice planning process is used as an aid to decision taking and an as clear as possible presentation. In this decision-centred approach to planning, the describing of the (strategic) decision areas is advocated.

To this end two levels of aggregation of the categorising of areas at a regional level have been established:

- a category of macro decision areas consisting of several categories of meso decision areas.
- a category of meso decision areas being the category of a specific decision area at regional level.

At sub-regional level or national level these decision areas categories are completely different as a consequence of the changed level of aggregation.

Categories of Macro Decision Areas	Categories of Meso Decision Areas
<u>Spatial</u>	Infrastructure, transport, water-, soil use, vegetation, natural barriers or transport routes, human settlement patterns.
<u>Social</u>	Housing, migration, participation, social services, e.g. education the basic needs, extended family structure, communality.
<u>Economic</u>	Employment, investments, market for goods, import/export, enclaves, profit-losses, feasibility.
<u>Managerial</u>	Phasing, planning, implementation, legal statutes, democratic decisions: top down and bottom up.

The above decision areas categories are by no means comprehensive. The broad linkage pattern existing between macro decision areas categories relative to one another may be indicated by means of a strategy graph. The decision area categories are used to aid the clear describing of decision areas. A decision area may be defined as a problem with its (possible) solution, and as such it is derived from the operational constraints which have been formulated for the region.

It is proposed to make use of a meso decision area impact report to identify the requirements (r) and effect (e) of a specific action or activity within the region. This process involves the estimation and description of anticipated effects on the environment, (albeit spatial, social, economic or organizational effects) resulting from diverse development strategies/activities within a region .

For example: A large scale agricultural industrial activity requires the the clearing of a large area of forest for cultivation.

Impact: of this could be forming of savanna, soil erosion or laterite formation making agriculture impossible = not favourable because of objectives - contradiction. Decision taken - no large scale clearing of forest to prevent the stated unfavourable effects and remain true to the objectives

Evaluation criteria: To decide whether an effect or requirement is favourable or not, or feasible or not a range of evaluation criteria are used:

- the diverse problems as sketched in Phase 1 of this report, problems which affect feasibility and favourability of alternative strategies for regional development.

Feasibility Criteria

- The amount of finance available for development for all regions.
- The capacity of construction of housing
- The existing infrastructural and facility package in the region= Houses, roads, bridges, railway, schools.
- The availability of know-how in the country for the supervising and realisation of projects, for example the amount of teachers, extension workers available for regional development.
- The likelihood of attracting migrants (especially the unemployed or marginally unemployed) to a region in a process of development. This is a policy matter and a fairly critical uncertainty in the planning. For a comprehensive description of Feasibility Criteria, see Part One.

Favourability (Evaluated by means of goals and especially objectives)

- The effect of activities on the ecology of the region.
- The social costs and benefits of a development activity.
- The lessening of international dependence
- The increasing of regional autonomy and self-sufficiency and so on.

For a comprehensive description see objectives

It is proposed to identify and estimate the impact of the four propulsive sectors of production. This will be done using the macro and meso decision area categories as an ordering framework. Where possible the effect described will be derived from, and related to relevant sources.

3.2

The Effects of Large Scale Industry

Within the range of propulsive sectors identified large scale industry in the region could include the mining and manufacture of available minerals for import and export use and possible extensive industry based on forestry e.g. manufacture of wood products, heavy machinery.

The Spatial Effects

- A heavy (concentrated) infrastructural package is required e.g. for transport whether it be by road, rail or river, as well as for the factories which by definition are large. Energy (electric, gas, oil or coal) and water are required in large quantities. The likelihood of pollution of all or part of the environment is very great, especially in an under-developed country where cheap production is possible because of the lack of legal measures against pollution, random mine dumps and waste deposit.

- A tendency of the power plant to locate close to the exploited resource. The selection of a site is related to transport costs, availability of energy and water. Site selection occurs first and foremost on the basis of economic priorities to gain maximum profit, and not social considerations. The location of the industry, unless nationalised, cannot be influenced, Fahrenkrog (1975).

- A large scale industry either attracts large numbers of paupers to profit from the high wage earners (this would lead to squatter settlements) or it remains an isolated enclave housing, feeding and entertaining its employers and employees. A compromise between these two effects is extremely exceptional and difficult to achieve, Katzman (1977).

The Social Effects

- Besides being spatially isolated, large scale industry is socially isolated and alienating as well catering (as it does) for highly paid skilled labourers. This could lead to increased social polarization in which dominance, exploitation, and favouritism thrive, McGee (1971).

- By being economically strong, the large scale industry could influence government policy in its favour which could lead to a neglecting of social priorities. The decisions of the state reflect the decisions of the dominating group.

- The social services, housing and facilities provided for the employees may be said to usually be of relative good quality, it being sound economic thinking to keep skilled workers happy in their job because of their scarcity in the labour market.

- By monopolising the market, the large scale industry sets medium sized industries out of business, and this leads to increased unemployment.
- New social strata in the region have new consumption patterns and new spatial behaviour - luxury goods could become a sine qua non.

The Economic Effects

- The regional economy mostly doesn't benefit from the large scale industry (enclave) production as the economy has no control over or say in this production, Katzman (1977).
- Requiring as it does large investments to set up the plant and pay the labourers, the reliance on foreign companies, capital and know how is inevitable. The need for large investments is accompanied by a large risk factor because of the unpredictability of the world market.
- As mentioned above, an increased consumption of luxury goods could lead to increased import of these goods.
- Marx has said that modern capitalism is 'determined by big industry and universal competition, which has cast off all semblance of a communal institution. The aim of capital is not to minister to certain wants, but to produce profit', (from Das Kapital)
- Hans Singer in 'The Strategy of International Development' 1975, Macmillan, identifies the following vicious circle, [redacted]
 " The capital intensive technology, [redacted] and the unequal income distribution creates a demand patters providing a limited market for the products favoured by the carriers of the imported capital intensive technology. The circle is vicious, partly because it limits markets and assures inefficiency and low degrees of capital utilization, but more importantly because it removes from the limited circle great and increasing masses of the population, particularly the young job-seekers."
 And (pg 125) on project aid to developing countries:
 "New capacity has been created, capital intensive and at high cost, profitable, if at all, only under strong protective cover. At the same time existing capacity, which could produce at lower additional cost and in the process provide more employment and cost less foreign exchange, stands idle for lack of finance , lack of repair and maintenance facilities lack of spare parts or components, lack of consideration in foreign exchange allocation or import permits, and also for lack of proper interest on the part of the managers and development planners. In this way industrialization has failed to carry over into general development.
 On the contrary, it has drained the rest of the economy, especially agriculture, of resources; failed to provide the necessary employment

and training, and remained a high cost enclave in a high cost economy".
 "... there is some ground for feeling that non-project aid has been unduly neglected, relatively to project aid."

The Managerial Requirements/Effects

- The administrative structure of a large scale industrial enterprise is either situated in the capital city of the country, or more often in the developed country of its origin. This tends to increase the contrast between a highly powerful, developed centrum and a dependent, backward periphery, Fahrenkrog (1975).
- Management if of top-down nature; local participation in decision making is possible and feasible only when individuals co-operate (e.g. in unions) to safeguard their interests, Rural Centre Planning (1978).
- A relatively small number of people need a specialized education to be able to work for the enterprise; this fostering elitism, class divisions and differential access to education.
- Planning and management for large scale industry is focussed on profits and economic stream-lining. This one-sided focus could mean a neglecting of social planning.
- Joint Ventures are often resorted to in Third World countries usually as a result of lack of finance and / or know how.

Singer (1975 pg.220) says of 'Joint Ventures', " For developing economies when partnerships take place there seems to be a definite functional specialization in which the foreign company deals mainly with matters relating to technology, management, foreign supplies and finance, while the local partner plays the role of mediator and deals directly with the local market, as well as handling sales, labour relations and publicity".

Comment on Large Scale Industry

The impression that emerges from large scale industry is a negative, un-favourable one. It threatens environment, increases imports and dependence on others for their capital and know how, increases social stratification and doesn't contribute to the decreasing of unemployment. The large economic returns that are hoped and planned for have a large risk factor because of the large investments required. Profits which do accrue pass way over the heads of the poor via the primate city to developed countries.

Implementation of large scale industry should therefore be avoided in an under-developed resource region so long as there are no guarantees (legally and otherwise) that the effects outlined above will become reality, as they so often have become in the past.

3.3 The Effects and Requirements of Small Scale Industry

The activities of small scale industry include manufacturing, processing and servicing (installation, maintenance and repair) under auspices of one manager, e.g. saw mills, carpentry - furniture manufacture for local markets.

Spatial Effects

- The chances of rapid negative spatial effects are small - overseasableness.
- A serviceable infra-structure is required to ensure the supply from and delivery to markets. This infra-structure need not be expensive as no large machinery, transport trucks or railway are by definition required.
- Small scale industry is not spatially bound to raw materials as it is to its market, which is mostly found in settlements of population concentration.
- Being generally not harmful to man or to nature, small scale industry could locate within an (existing) settlement, thereby reducing the commuting distance from home to work.

Kropotkin would like to see 'industry coming to the village' in the shape of a socially organised industrial production with the full aid of machinery and technical knowlegde' (in Ward 1974).

Social Effects

- By making use of simple technologies and know how, the acquiring of skills and absorption of the unemployed is made possible. A small scale industrial enterprise, if functioning well, may be thought of as a college for acquiring skills in the field, a practical useful tool for the training of the unskilled unemployed, Schumacher (1971).

- Because of the smaller number of employees, the rights of the individual are at risk, the formation of a strong union being unlikely. However the employees have to negotiate with only one, and not a council of managers.

- The labourers' alienation from his product and his work is not as great as in a large enterprise.

- Social integration rather than social polarization is to be expected from small scale industry.

The Economic Effects/Requirements

- The state may, and should become actively involved in the stimulation of small scale industry. This would require subsidies, the revising of tax

laws, export and production levies, and extension workers to guide and improve techniques, Marsden (1974).

- It may be expected that once small enterprise is operational, its dependence on the state for loans /subsidies may decrease because of its self sufficiency.
- Being mostly a locally oriented production because of its small scale, the industry would contribute to import substitution of essential, frequently used goods, such as furniture, cloths (carpets, clothes, blankets) and domestic utensils (pots, pans, cutlery).
- Investments, effort and expensive labour are hardly required making the development risk small.

Managerial/Organizational Effects

- An initial managerial effort is required to get the small industries off the ground. State employed extension workers could streamline and improve small scale industry, as well as guiding the integration of the unskilled un-employed into the enterprise.
- An education for the acquiring of skills, such as carpentry or mechanical servicing at high school level would provide a thrust to small scale industry, Friedmann et al. (1974).
- Destructive competition between rival enterprises should be avoided by state measures to maintain an equitable distribution of contacts amongst the various industries.

Comment on Small Scale Industry

The difference between small and large scale industry that emerges is somewhat like night and day. The Third World countries are small in economic power, and it seems logical that they should adapt their ends (to achieve economic independence) to their available limited means - there's no crime in thinking small, as many are led to believe.

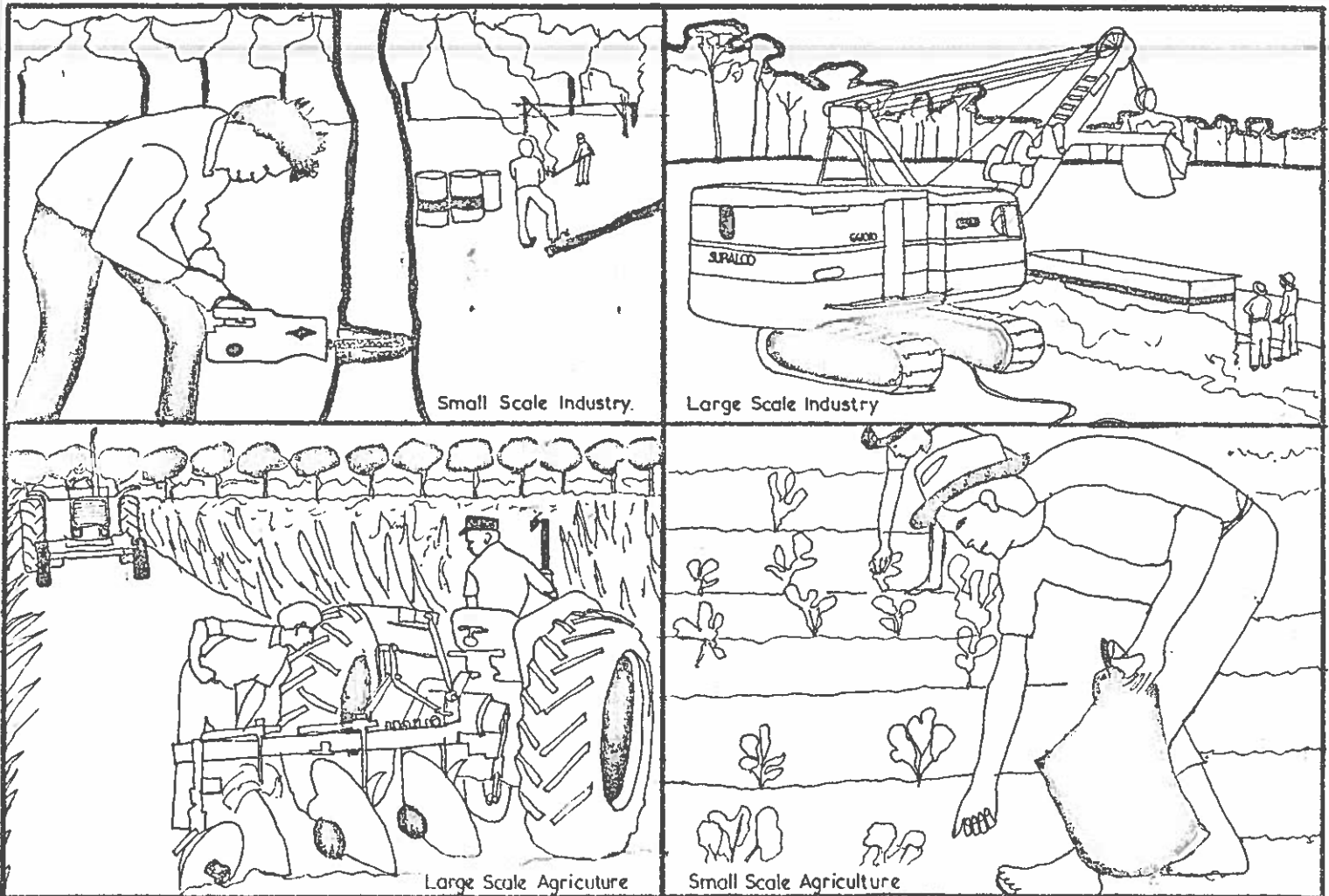
In his paper 'The Role of Small Scale Industry in Development' (1974) Keith Marsden states that smaller enterprises with a lower level of investment per worker tend to achieve a higher productivity of capital than do larger more capital intensive enterprises. He forwards the following possible reasons, which are of especial interest in the context of large scale industry vs. small scale industry:

- the small scale entrepreneur makes more intensive use of cheap labour and his scarce resources of capital, equipment and land.

- Large scale organisations need to pay higher wages because of trade unions and labour legislation. There are few pressures on the organisation to use resource- and labour saving devices.
- Machinery for small enterprises is relatively cheap.
- High technical and managerial skills are necessary for large technology.
- More discipline and organisation of employees are required in a large scale organization, and social customs make these difficult to observe.
- Small firms allow skills to be acquired on the job as a result of a lower level of (required) technology.
- Large scale plants may become utilized at a non-optimum capacity because of a fragmented structure of the world market

Although some of these points have already been mentioned, it is useful to see them set out succinctly and together as Marsden has done.

In concluding the comment it would appear that small scale industry emerges favourably, with certain provisos, as a regional development propulsive activity in the Third World.



3.4 The Effects/Requirements of Large Scale Agriculture

Should areas of cultivation exceed 10ha, the term large scale agriculture will be applied. This area is based on present farm land sizes in Suriname. The region has potential for oil palm, rice, pepper on a large scale. Large scale agriculture need not necessarily be highly mechanised but this is a trend because of salary saving.

The Spatial Effects

Large areas need to be cleared on level gradients - deforestation of large areas makes regeneration of forest impossible. Soil erosion may be speeded up and the moisture cycle adversely affected. Cultivation of one or few crops only could over-burden the soil-fertility. Goodland & Irwin (1975).

Although the cultivation is spread out, it is to be expected that the settlements will be concentrated in a rural service center - in which education, health, maintenance, storage and distribution services may be concentrated, e.g. New Nickerie.

Infrastructure could be relatively thinly spread because of the large farm areas, but it would have to be of a relatively large scale in accordance with transport, irrigation and energy requirements. See comparison after Comment. The large periphery is relatively dependent on a central place (rural agricultural service center) to function well.

The Social Effects

A skilled top layer is required to exploit and utilize the large investments, organization of labour and machines in optimal fashion. Immediate participation of all social strata in this decision making is therefore ruled out.

The possibility exists that a large scale agricultural enterprise may absorb and/or monopolise smaller enterprises in a region. Wages and work conditions may be more attractive and this could lead to the stagnation of small scale agriculture - no labourers.

- Certain crops (for example rice) are dependent on seasonal labour (twice a year). Continuity of employment is therefore severely hampered making labour in this sector un-attractive, Hartevelde for Prosur (1977).

- With its skilled managerial top, the labourers could easily be exploited unless organised. This exploitation could result from a desire to maximize profits, or from competition with other producers, for instance, Van Waesberge (1976), provides examples.

- As with large scale industry, the possibility of social polarization is great, the division between a managerial top (feudal lords) and the labourers (peasants) being all too clear. This could be avoided by legal control and democratic participation.

Economic Effects

- Large investments are required for buying/clearing, land, machines, labourers' wages/services; experience has shown that the risk factor is also large. (Ground nuts in Africa, rubber in Brazil).
- Large scale enterprises are generally more expensive to run than small scale enterprises. Reasons are: expensive machines for the large areas, higher wages, more discipline/organization is required. (See Marsden's comparison between small and large industries:)
- The tendency to cultivate a single crop only, because of economies of scale, in large quantities means that the internal market is either saturated or by-passed in favour of the export market. Competition, export taxes, transport costs, lower profits all indirectly increase the economic dominance of the countries to which the goods are exported.

The Managerial/Organizational Effects

- An efficient managerial structure is required to anticipate and plan for the export market. Know how and experience are important in this regard.
- Vocational guidance and education are required to prepare the labour force for their task. To this end an agricultural school, to which may be linked a crop-testing base, is essential to implement and monitor production, Harteveld for Prosur (1977).
- The development and use of new techniques is a source of constant investigation because of the large savings that could be possible from one small innovation, Friedmann (1973).

Comment

Large scale agriculture does have some unfavourable effects. This does not mean that its use as a development strategy for a region should be vetoed. By careful measures to balance natural-human activity, e.g. by cultivating a diversity of crops, careful selection of areas to be cleared, keeping areas to minimum workable sizes, large scale agriculture may have distinct advantages as a productive and employment increasing activity.

3.5

The Effects of Small Scale Agriculture

For definition purposes, farmland smaller than 10 ha is thought of as being small scale. It doesn't follow that because the land is smaller, the techniques need be less or even not mechanised. This depends on available techniques, know how and the desire to modernise.

Spatial Effects

- Infrastructure may be of small size, an extensive network is required within a relatively small area. Seeing that the land areas are relatively small, a close fit may be achieved with the landscape with regard to topography and the changing soil structure in the region. This is favourable ecologically as it promotes a diversity in space and a continuity over time, thereby working with the ecological balance of the region and not against it.

- Two spatial stereotypes are characteristic of small scale farming in Suriname: 1) ribbon development, either close to or far away from existing settlements; 2) farming village (e.g. Washabo) where the advantages of living together are combined with self-sufficient production. The farming village as found in the region is discussed elsewhere in the report. Ribbon development is often characterised by spontaneous colonization of land adjacent to a road by the poor and unemployed on which subsistence farming is done, Nelson (1973).

- The spatial structure could consist of: village or ribbon settlements which depend on a rural service center for their supplies and as market for their products. Services such as a hospital, large schools, specialized health care, cultural activities (theater, films) may be present in the regional center, Rehovot Settlement Study Centre, Israel (1969).

The Social Effects

- To counter the attraction that a city exerts on the rural population services for them should be of a relatively good quality. The services provided should go a step further than basic needs to the maintaining of a quality of life which compares favourably with that of the city. (or the quality that the migrant thinks exists in the city). Education and management is necessary to enlighten migrants and influence their decision making for the better, Rural Centre Planning (1978).

- Being of small scale, the acquiring of skills is made easier, the farmer learning directly from others and extension workers, Marsden (1974).

- Existing social divisions are decreased by enabling the unemployed to improve themselves, thereby diminishing the gap between them and the highly paid and educated elite and providing them with their basic needs.
- If, as is the practice, the farmers work their land and farm it themselves, the competition incentive is increased. This may be good in that it increases production, but bad in that one or a few farmers gain control of the farming activity (by better organization, larger, more fertile land, mechanization.). This control could inevitably lead to marginal practices, and may be avoided by encouraging cooperative farming techniques and controls on exploitation of people or land, Galjart (1976).
- The furthering of one's own interests is an important stimulus to production, and these interests may be furthered by becoming a member of a cooperative/communal farm, where it is realised that 'unity is strength', Galjart (1976).

The Economic Effects

- Because of a smaller scale and individual management of one's business, investments need not be great. Production is built from the bottom up and requires small initial investments, not a large investment all at once. This reduces risks to the investors, but efforts and planning are still required to ensure profit maximization for all, Moscovitz (1969).
- The continuity in time already mentioned is economically favourable as well - risks are spread over time making the refining of techniques and improvement of profits possible as one learns from experience and feed back.
- Although the latest expensive techniques may be used in small scale farming, this is not as necessary as where large investments are involved. Efficient, cheap, adapted technology may be incorporated because of the small scale. This avoids the need for acquiring skills which may be out-dated in a few years, Schumacker (1971).
- A diverse range of products may supply the region and country's needs. The possibility of export is left open and is not a necessity.

The Managerial Effects

- Small scale farming requires directed policy to stimulate and improve its development. This entails: information spread to a large number of (unemployed) inhabitants, agrarian reforms (control and distribution of farm land, protection against monopoly take overs), extension workers,

adequate infrastructure and social services.

- The need of cooperation is great for the small scale farmer; therefore such cooperatives/communal farms should be encouraged by the state. In this way the use of machines, tractors, irrigation equipment, cold storage facilities may be improved. Agricultural experience may be compared and research projects set up.
- Farming activities may be phased in shorter periods than is the case with large scale industry.

Comment on Small Scale Agriculture

It would seem that small scale agriculture may be a favourable development activity for a region. However, as with all other activities, it too requires specific measures and planning to ensure its progress and safeguard its existence. Experience has shown that it requires more attention and monitoring, simply because it is so easily overlooked as a means of modernising a region. Because of this neglect in the past, this activity has decreased and suffered the most, relative to (and usually at the expense of) the other propulsive sectors. And yet it is the basic development/employment unit of an under-developed land. It furthers self-sufficiency in that the basic, staple goods need not be imported, as is so often the case in a Third World country.

It could be argued by the state: Self-sufficiency, then what?

The reply to this is:

- self-sufficiency has never been strived for in the past, even though its importance has been and is recognised. The prestige, show projects to keep the masses happy and impress them have gained priority, whilst bypassing the physical and social needs of the masses. Growth Poles (e.g. Brazilia, Ciudad Guyana) are examples of procrastination in dealing with the most strategic problems/needs of the inhabitants.

The future alternatives of small scale agriculture should be determined before implementing it as development activity. What happens to an enterprising farmer who has mastered the tricks of this trade? Possible answers could be:

- managing of a cooperative
- the farming of more land but at the same scale
- introduction of home industry/processing of products. This could include packaging, transport and sale of products.
- a maintenance service of farming equipment and machines.
- more intensive farming vs. cultivating labour-intensive crops.

3.6 The Combination of StrategiesIntroduction

From the above impact report it becomes apparent that all propulsive sectors have both advantages and disadvantages. However, it seems that the large scale industry and agriculture have comparatively greater disadvantages than small scale industry and agriculture. It would be unwise to veto these two sectors in the development of the region, as it may be possible that they have advantages peculiar to them which cannot be found in the small scale activities. Comparatively speaking the large scale activities need to be handled with much greater care and circumspection to minimise their negative effects.

It is apparent from Part One that Suriname is an underpopulated country. The logical extension of a small scale country would seem to be small scale activities. This for the following reasons:

- the needs of the local population are easily saturated - self-sufficiency is easily obtained.
- the labour force, although having 25-30% unemployed, is small when considered absolutely. This means that the productive capacity is relatively small.
- ~~the larger a project is, the more it costs the state, this means~~ there is less investments to go round for alternative projects.
- taxes gleaned from the inhabitants are relatively small because there are so few inhabitants and many of them are living on or under the poverty level. Again this means that the state's budget is limited.

In any case, the increased job opportunities offered by especially large scale industry for the local inhabitants may be said to be nihil, because this activity is prone to enclave-formation, Katzman (1977).

All this indicates that strong priority should be given to small scale activities which have a good fit with the country's capacities, but that strategically advantageous (in accordance with the goals and objectives) selected large scale activities may and should be incorporated in the development strategy for the region.

Strategy Combinations

The total number of combinations that are possible, bearing in mind that Large Scale Industry (LSI) is at all times present in a combination in the form of the mining of bauxite with subsequent aluminium production, are listed below:

- a) Large Scale Industry only (The present mining activity and infrastructure)
- b) LSI + small scale industry
- c) LSI + large scale agriculture
- d) LSI + small scale agriculture
- e) LSI + small scale industry- + large scale agriculture
- f) LSI + large scale agriculture + small scale agriculture
- g) LSI + small scale industry + small scale agriculture
- h) LSI + small scale industry + large scale agriculture + small scale agriculture.

Two types of criteria are used to determine which combination is more favourable for regional development relative to other combinations:

- 'Soft' criteria, being based on the goals and objectives formulated by the planner, in which subjective preferences and political decisions by the planner are involved.
- 'Hard' criteria, being derived from statistics and empirical studies. Examples include existing size of the internal labour market, number of unemployed/marginally unemployed, the existing infrastructural package in the region, the existing development intentions/activities, available regional resources.

The difference between hard and soft criteria may be formulated as follows:

Hard criteria describe factors that the planner has little or no influence over, on the contrary, hard criteria have an influence over the planner in that they describe the limits in which he may still make alternative proposals without being utopian.

Soft criteria may be altered at will by the planner when he receives more information and listens to other points of view, for example.

Soft criteria (viewpoint, goals and objectives) have been operationalised as follows to test combinations:

Spatial: Does a strategy combination destroy or enhance the ecosystem of the region?

Social: Does the strategy combination provide a **strong** pull to the poorest strata i.e. target group?

Economic: Does the type of employment offered by the strategy combination provide a wide range of presently unemployed with more than their sub-subsistence income?

Managerial: Is top down, but especially bottom up democratic participation furthered by the particular strategy combination?

The Hard criteria for testing purposes are:

Spatial: Is a strategy combination flexible enough to make use of existing regional infrastructure and even benefit from it, without damaging the landscape?

Social: To what extent are urgent social needs met with by a particular strategy combination for future regional inhabitants and the other Surinamese?

Economic: What are the comparative costs of implementing and maintaining a strategy combination. Is it economically feasible?

Managerial: Which strategy combination may be managed with the least effort, and external know-how, i.e. how experienced are the Surinamese in managing particular strategy combinations?

The above eight criteria, one soft, one hard per decision area category, form the testing criteria for the eight strategy combinations.

A matrix for the testing of the eight combinations was set up - the same testing criteria being used for each combination (see following page). Results obtained are limited by the level of abstraction and, in some cases, the lack of available information. In effect computer-aided testing could improve results as more variables/statistics could be introduced, the testing becoming more specific. This would require a fair amount of man-hours however.

It is apparent from the matrix that the strategy combinations b), g) and f) (in that order) have emerged as being most favourable:

- A -- LSI + SSI + LSA + SSA
- B -- LSI + SSI + SSA
- C -- LSI + LSA + SSA.

The combination which emerged as being most favourable - A, will be linked to a suitable settlement pattern to form a development model.

Decision area categories Strategy Combination	SPATIAL Ecosystem impact? Use of (existing) infra- structure?	SOCIAL Benefits to the poor? Alleviation social needs?	ECONOMIC Improved income for many? Feasibility/Risk?	MANAGERIAL Participation? Existing experience?
a) Large scale industry only	Concentration + large infrastructure = unfavourable impact U	Enclave offers few benefits to the poor, or alleviation of general social needs U	Limited income improvement Large investments = large risks = feasibility doubtful U	Top-down = little involvement in decision making. Experience is present, though know-how is still absent. U
b) LSI + Small scale industry	Industrial escalation/one sidedness = unfavourable U	Limited benefits offered by limited industrial employment U	As above, with slightly reduced risks. U	As above, with greater scope for participation and use of existing experience U
c) LSI + Large scale agriculture	Diverse types of infrastructure, including existing are required. M	Few opportunities, because many are excluded -- increased stratification. Bridge unskilled-skilled labour is absent U	Improved income, but not for many from exports. Risks are large, machines being expensive M	Few have know-how - 'the higher, the fewer', also as regards participation. U
d) LSI + Small scale agriculture	Reduced concentration = more favourable, New small scale infrastructure required M	Offers benefits to unemployed farmers, but no one else. Stratification because of extreme opposites U	Self-sufficiency reduces present import and risk margin. F	Extreme opposites in management/guidance difficult. Rights of farmers are overshadowed U
e) LSI + small scale industry + large scale agriculture	Ecosystem has a heavy onslaught. Existing infrastructure well used but large. U	No bridge between unskilled and skilled farming = exclusion of many. U	Export orientated = greatest benefits to top-layer. Expensive to implement U	As above with little scope for participation U
f) LSI + large scale agriculture + small scale agriculture	Stress on concentration gives small scale activity little chance -- over-concentration has negative impact. U	Includes many unskilled poor and could alleviate their social needs. Stratification farming industry M	Improved/improving of income is possible. Reduced risks. F	Small scale rights/participation are dominated by desires of top-layer. U
g) LSI + small scale industry + small scale agriculture	Concentration tendency is balanced/countered by dispersal. Infrastructure well used. F	Bridge unmechanised/mechanised farming is supported by small scale industry = benefits but stratification is likely. M	The fair balance between import-substitution and export reduces risks greatly F	Participation is possible and probable as top-down demands are balanced by bottom-up requests. F
h) LSI + small scale industry + large scale agriculture + small scale agriculture	Diverse (small) activities don't threaten ecosystem. Rural development is possible. F	Offers opportunity on a broad front. Bridge unskilled/skilled, integrates and escalates many. F	Scope for rising up occupational ladder = possibility of (self) improvement. Risk of large scale activities are carried by small scale activities F	Comprehensive management is required. Participation is possible Existing experience is available. F

U = unfavourable impact M = medium impact, being neither unfavourable or favourable
F = favourable impact.

The Testing of Strategy Combinations

Comment - Uncertainties/Assumptions

Although the previous matrix seems to suggest a certain precision/sureness in decision making, this misleading impression (which is not intentional) may disappear when uncertainties which play a role in the choices are indicated. At the outset it was assumed that there are four propulsive sectors in regional development - this was done for manageable impact analysis and eventual combinations. For example by splitting small scale agriculture into its constituents fishing, cultivation and livestock activities, impacts may be analysed with greater detail and accuracy. However, if this were done for all four sectors, the list of constituent activities would become endless and overseeableness would disappear. A similar argument holds for the abstraction of decision areas into four major categories. Each category has many sub-categories, of which only two main ones were selected, again to enable an as accurate and overseeable decision making as possible with available resources.

The conclusion to be drawn is that each decision taken is a function of the level of abstraction or aggregation at which it is taken. By investing more effort and man power into detailed testing of strategy combinations in which all constituents are taken into account the accuracy of the output would improve greatly. However, it is contended that within certain margins, the outcome of such extensive testing need not differ greatly from that arrived at in the previous matrix, even though uncertainties/assumptions do feature in it.

PHASE 6

Comment - Uncertainties/Assumptions

As with all other phases, decision making in the process of selecting a regional development model is haunted by uncertainties and assumptions at times so diaphanous that they are difficult to identify. Policy values established in Phase 2 may be a certainty to the one holding such values as being essential to regional development, but they are not necessarily shared by everyone. For example the local Indian inhabitants may have as main policy value strengthening their social structure by retaining their land and life style, whereas the government's main policy value may be (and is) the striving for an as rapid economic development as possible, a value which by definition neglects social development/policy values of local inhabitants.

Wherever decisions have been taken with the policy values as one of the main testing criteria (as in the selecting of an optimal strategy combination) an assumption on the part of the decision maker is in evidence. He assumes that those to be affected by his decision share his point of view/policy values for regional development. It is here where planning has been said to be a political activity - action based on political conviction or bias.

Therefore, although decision making seems at times to be 'untouchable and incorrigible' when presented in a tooled up, technological way, it should be remembered that this is not the intention of present decision making. On the contrary, it is hoped that by presenting the decision making process simply and clearly, participation in the process becomes possible and probable, and this participation provides valuable input to re-structuring and re-thinking of the decisions taken.

6.0 The Regional Specific AnalysisResumé

The development model selected in the previous phase is to be located in specific regional space i.e. the region West-Suriname, using a regional specific analysis. A regional specific analysis entails the location of productive potentials as well as areas which are suitable/unsuitable for settling in the region. To this end the Potential Surface and Threshold Analyses completed by the ISP West-Suriname (1978) are used. However, as doubts arose regarding the outcome of these analyses, especially with regard to zones adjacent to the railway between Priority Area 1 and 2 (see map on the following page) three Plan Studies were consecutively undertaken for this zone to verify/falsify the ISP's findings. The eventual conclusion derived from these Plan Studies, served to verify and underline that of the ISP, as it could now be stated with greater certainty that this railway zone is indeed unsuitable for activity/settlement.

The development model was finally located within the two Priority Areas, in accordance with location criteria firmed up/refined in the work process.

6.1 The Potential Surface Analysis

Results of the P.S.A. are indicated on the following map. A number of factors of importance in determining whether a location (10x10 km sq.) is suitable of unsuitable for settlement were taken into account.

<u>Economic factors</u>	<u>Allocated priority weight</u>
1) Presence of minerals for mining purposes	10
2) Suitability for agriculture, forestry, live stock	5
3) Suitability for recreation or tourism	4
<u>Physical factors</u>	
4) Suitability of soil structure for settlement (bearing capacity, drainage, undulations)	3
5) Water	2
6) Climate	1
7) Transport	1

Two main priority areas emerged which had relatively the best weighting (Priority area 1) and 2)) and these two areas became the subject of further more detailed threshold analysis.

Priority given to mining is disproportionately large, but a sensitivity analysis was applied in which agriculture and mining were allocated equal weights. The findings did not differ greatly, with the exception that the squares which have secondary priority increased in importance.

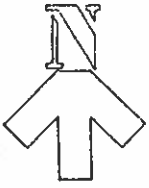
These secondary areas emerged primarily because of their agricultural potential, but were excluded from more detailed analysis for reasons given at length in the ISP, West-Suriname Report, (1978).

WEST-SURINAMIE

ATLANTISCHE OCEAAN

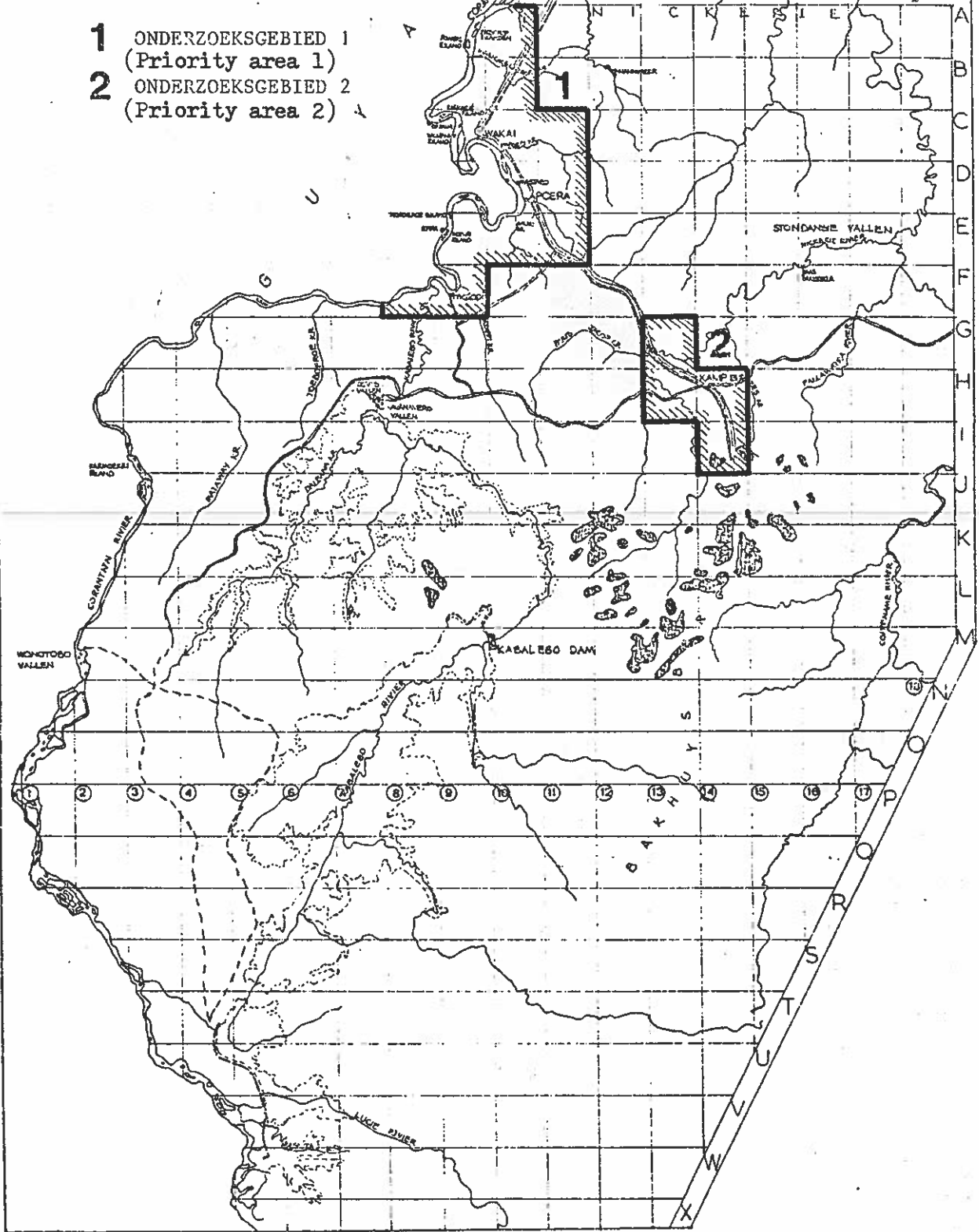
SCHAAL 1:500 000

RASTER 10-10km



Source: ISP West-Suriname, (1978).

- 1 ONDERZOEKSGBIED 1
(Priority area 1)
- 2 ONDERZOEKSGBIED 2
(Priority area 2)



6.2 The Threshold Analysis

An adapted form of Threshold Analysis was applied to Priority Area 1) and Priority Area 2) demarcated/identified by the Potential Surface Analysis. Findings of the Threshold Analysis for the two priority areas are indicated on the two maps which follow.

Factors which were considered in the mapping of threshold lines included:

- the degree of slope/undulation of the terrain
- natural run-off and soil drainage
- bearing capacity of soil for foundations
- workability of the soil
- future water supply and waste removal points.

Three extremely suitable areas for settlement were identified in Priority Area 1), as indicated on the map. One of them turned out to be exactly at Apoera, the other two up-stream and downstream from Apoera.

Because of the undulating terrain in Priority Area 2) only a small area in the upper-left is comparatively most favourable for settlement; Camp 52 and the Bakhuis mine being situated in undulating terrain at present. The crossing of the railway and the Nickerie river has been previously identified as extremely suitable for settlement by the ISP West-Suriname.

Reasons for the suitability of this location include:

- it lies at the junction of two different soil types - the sandy soils which are suitable for settlement and the granitoid weathered soils, which are highly suitable for agriculture.
- River estuary soil is more fertile relative to higher soils.
- The Nickerie river (40 m wide approx.) provides a large, constant water source, as well as recreation/fishing possibilities.

The above represents a summary of the findings of the Threshold Analysis as carried out by the I.S.P. West-Suriname (1978) in the process of arriving at their regional plan. The following two maps compiled by the I.S.P. West-Suriname indicate which areas in the P.S.A. Priority Areas 1) and 2) are most suitable for settlements.



TA Priority Area 1
Location for Settlements
Scale: 1:200 000
Grid : 1 km x 1 km



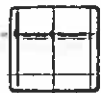
First priority



Second (slope)



Third (less drainage)



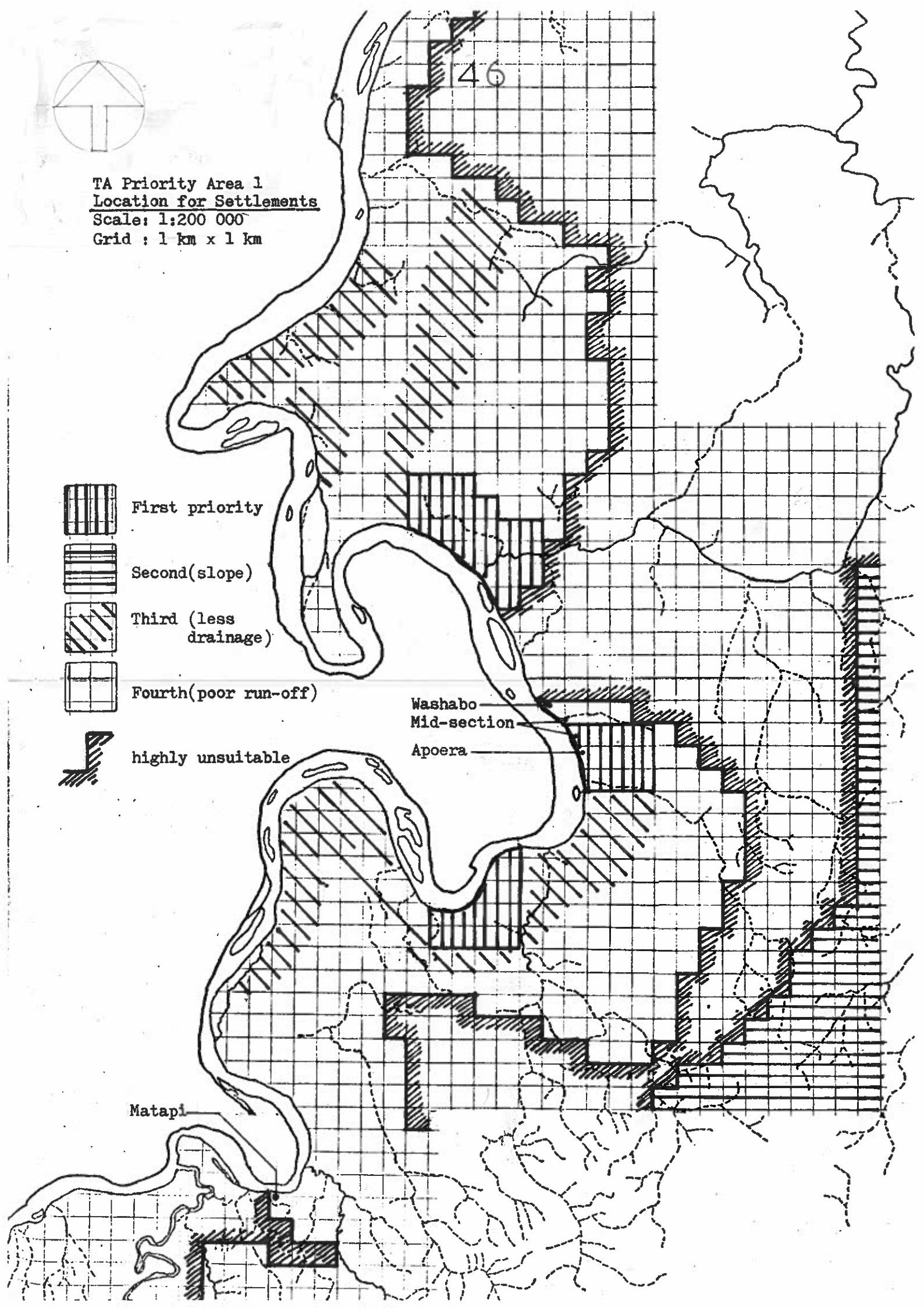
Fourth (poor run-off)

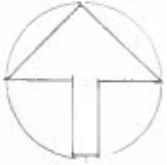


highly unsuitable

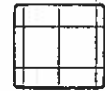
Washabo
Mid-section
Apoera

Matapi

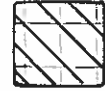




TA Priority Area 2
Threshold for soil and water
Scale: 1:200 000
Grid : 1 km x 1 km



First priority

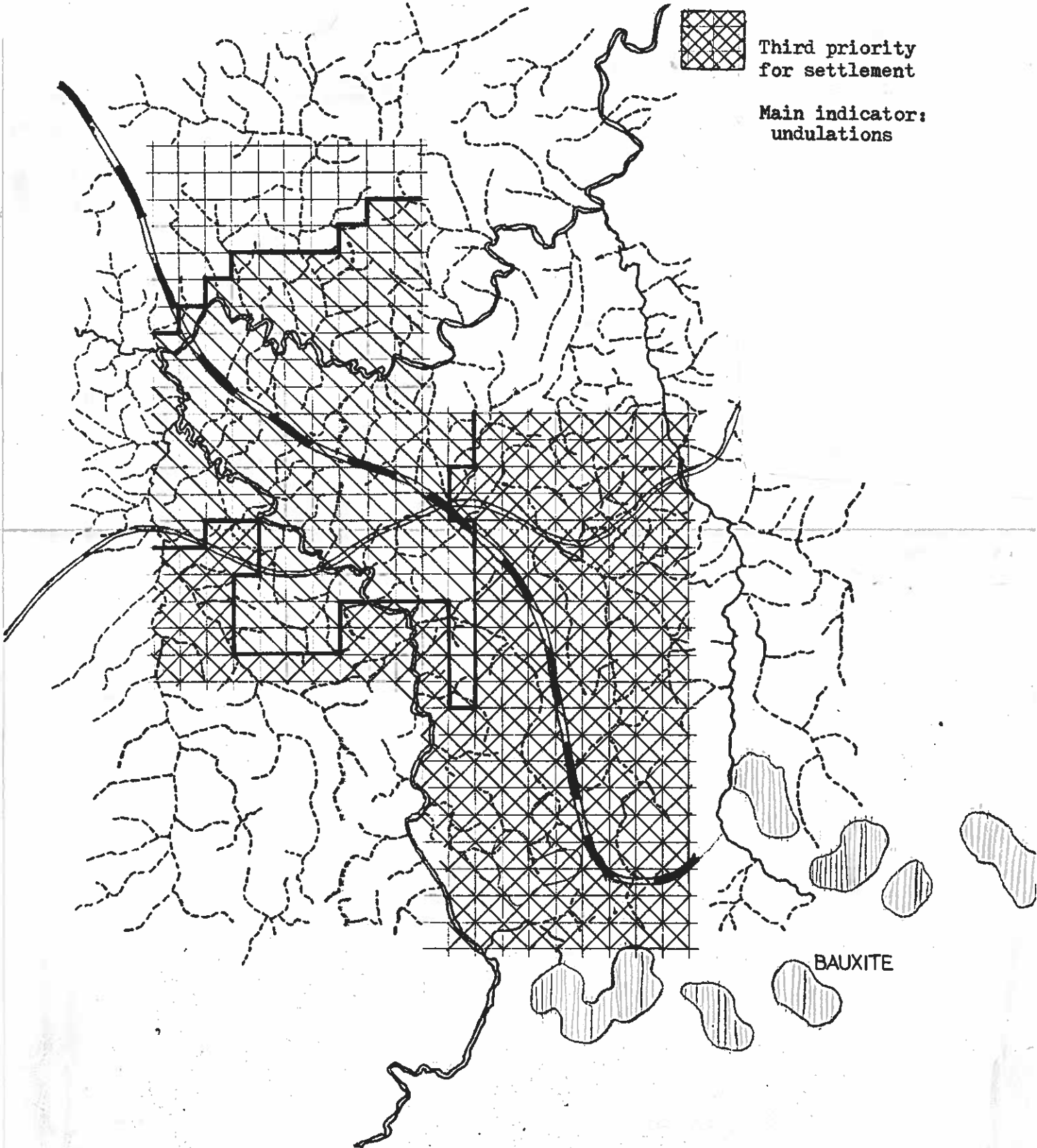


Second priority

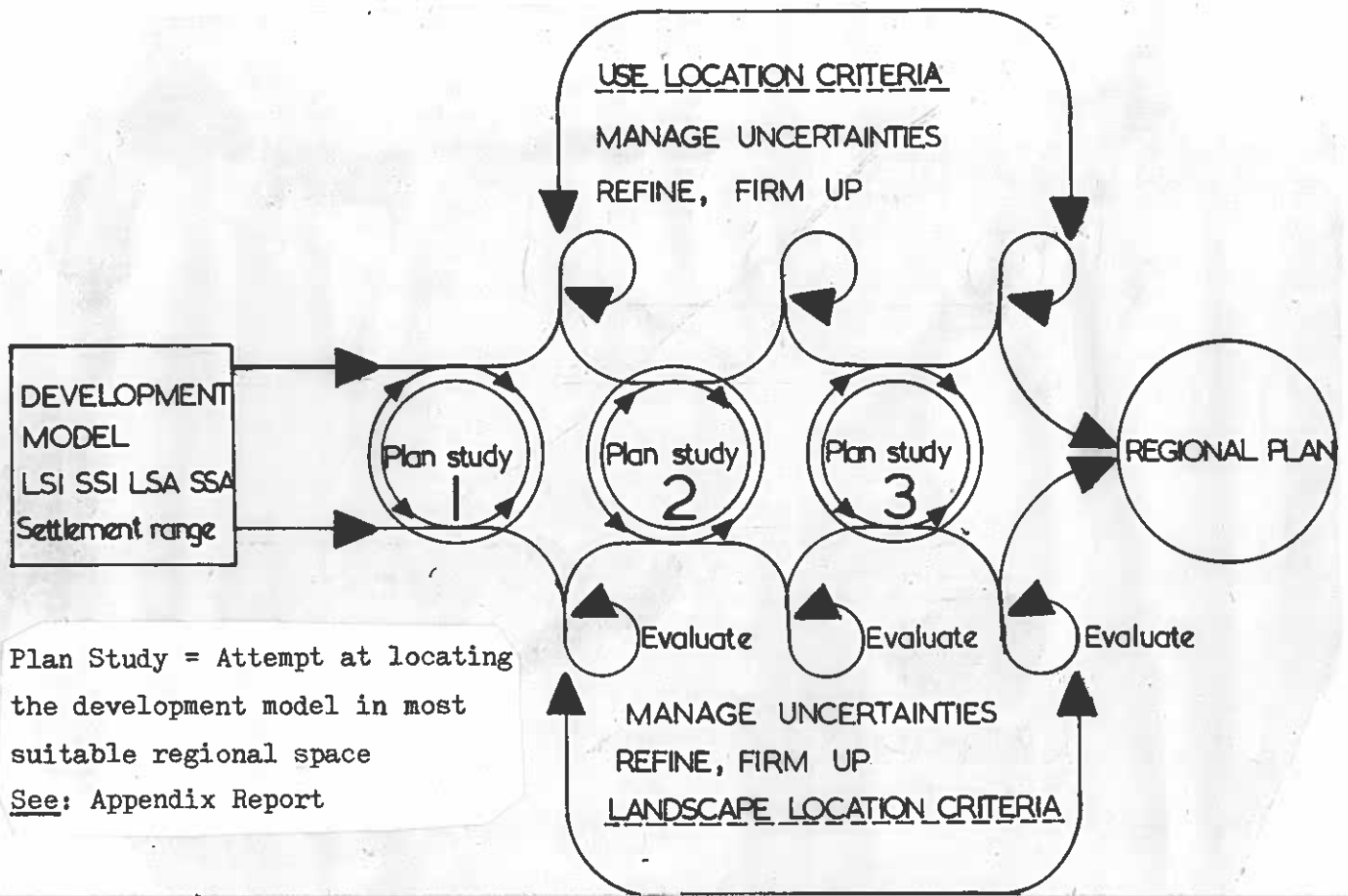


Third priority
for settlement

Main indicator:
undulations



6.3 The Location of the Development Model



Plan Study = Attempt at locating the development model in most suitable regional space
 See: Appendix Report

Sub-work Phases in Locating the Development Model in Regional Space

Location Criteria

Two main location criteria categories were identified, both of which were further refined/operationalised subsequent to each completed plan study (see Appendix Report). The location criteria are used to determine as accurately and rationally as possible the optimal location of the development model. The following criteria categories were identified in the process of generating alternative plan studies:

Settlement Use Criteria

Such location criteria are specific to the specific types of settlement and their relationships, aspects which have already been analysed at length in Phase 4, especially sub-phase 4.6 - 'A Range of Settlements'. Most important factors include:

- Distances between settlements of specific hierarchical function and size. Distance and type of infrastructure determine travelling times between settlements. See phase 4.4, page 113,114 and 116.

- (Social) service package per settlement type and size. Having (personally) analysed the size-services relationship in the ISP West-Suriname's work process, these findings are to be re-used, see page 164.
- Existing/proposed regional infrastructure and its capacity per mode.
- Physical barriers to new infrastructure, (natural e.g. rivers, hills and man-made e.g. canals, dams, surface mine excavation).
- Activity of each settlement type, e.g. export producing settlements should locate closest to the export off-set route and harbour. Farming villages should locate on best farming soil (erosion free, fertile, ample water), services centres should locate centrally and as close as possible to the villages they serve.

Regional Landscape Location Criteria

These location criteria pertain to (changing) characteristics of the regional landscape. As with the use criteria, the landscape criteria were refined subsequent to each plan study, and as improved information became available. Landscape location criteria include:

- Pollution - All areas are subject to pollution, but some areas will have greater unfavourable impact when polluted e.g. pollution of streams which flow through large unspoiled hinterlands. See map page 151.
- Erosion - Areas with steeper slope, mountain tops/ridges (watersheds) and source areas (recessing erosion) are all subject to relatively increased erosion danger. In contrast flat, low-lying lands, and down stream river banks are less subject to erosion danger, see maps on page 151,152,158,159.
- Type of soil - Relative fertility of the soil type, its workability (hard, soft, muddy, dry) presence of minerals/ores, sandy/clay. See map page 150.
- Type of vegetation - Swampy forest, inland dry forest, savanna vegetation. Goodland & Irwin (1975) suggest that the savanna areas in a rain forest should be exploited first as the more precious pure rain forest can then be preserved for a longer period, see map page 153.
- Natural barriers - Large rivers, mountains, undulating terrain and dense vegetation all form barriers to accessibility which should be evaluated when many interlinked settlements are envisaged, see maps page 158 and 159.

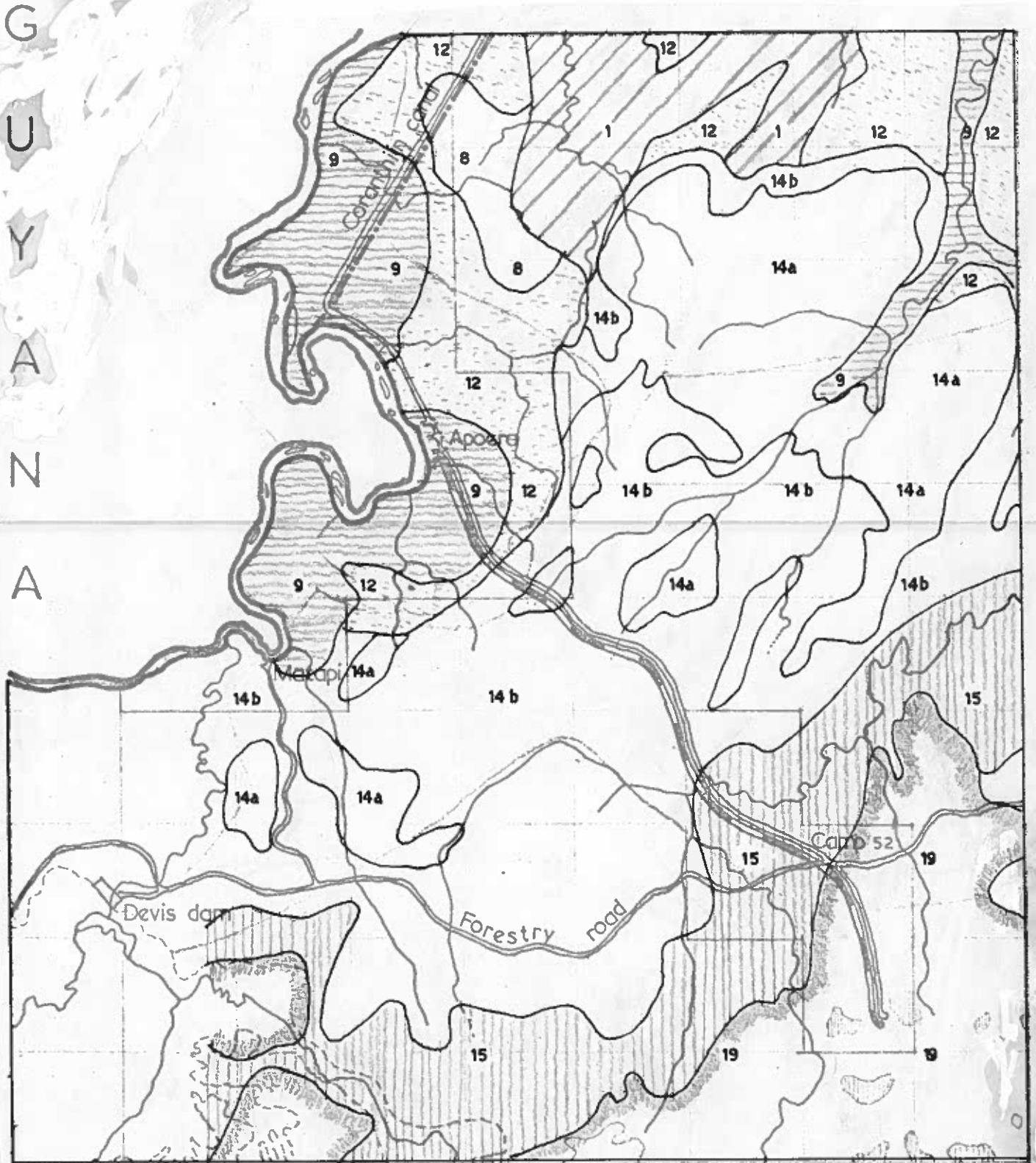
150 WEST SURINAME



SOIL TYPES

1. Peat,unsuitable for settlement and agriculture
8. Eustatic peat,unsuitable
9. River estuary sediments-suitable for settlement/agriculture
12. Para-sediments-unsuitable
- 14a Sandy soils-suitable firstly for settlement
- 14b
15. Granitoid weathered soils-suitable for agriculture
19. Metamorph complex soils-unsuitable for settlement/agriculture

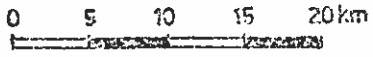
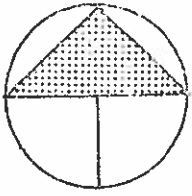
0 5 10 15 20 km



Source: MIAOP 1977

WEST SURINAME

UNSUITABLE SETTLEMENT/ACTIVITY AREAS



—•— Main Regional Watersheds



Sensitive Source/Catchment Areas (Not to scale)

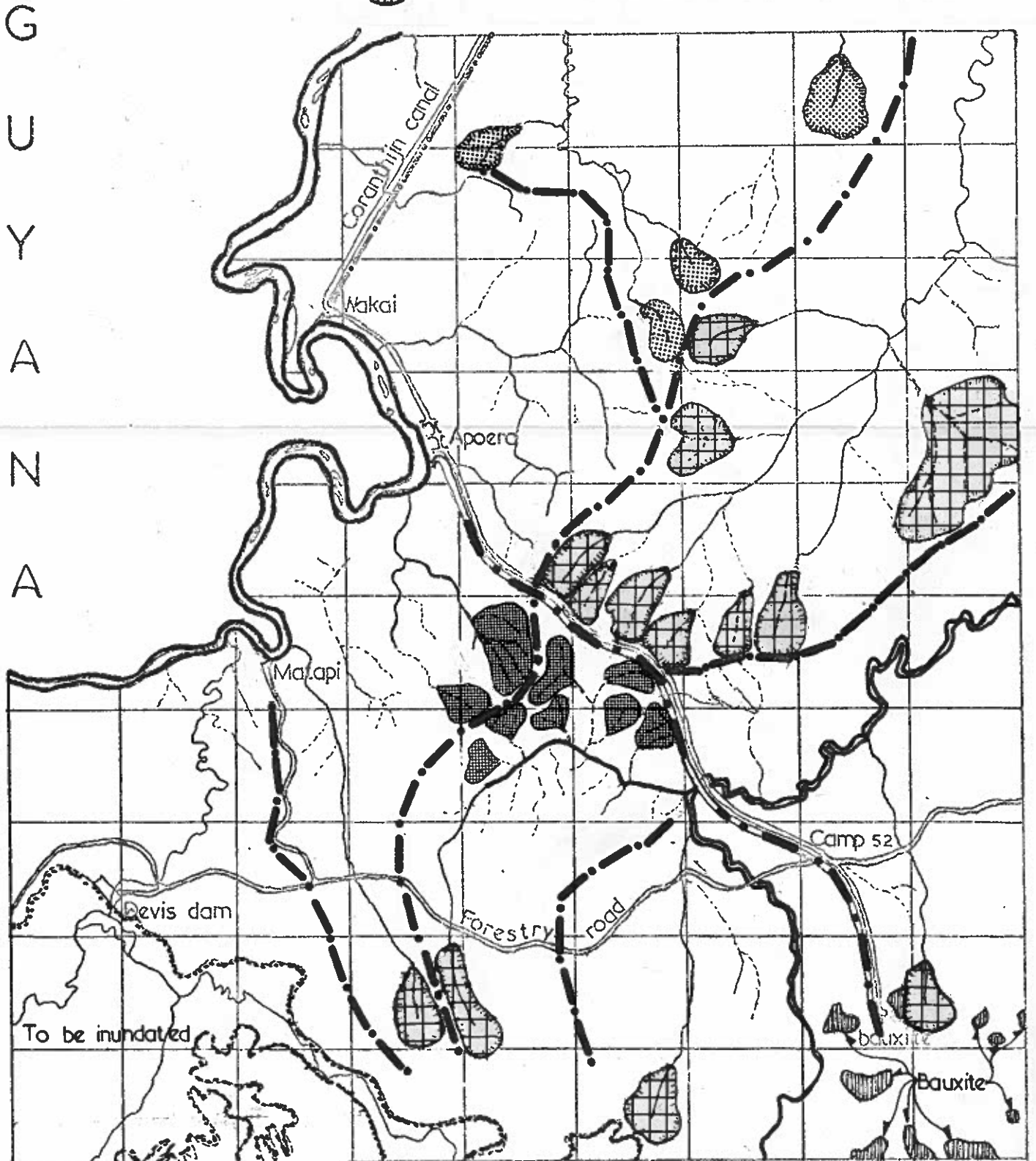
Pollution of extensive hinterland and erosion danger

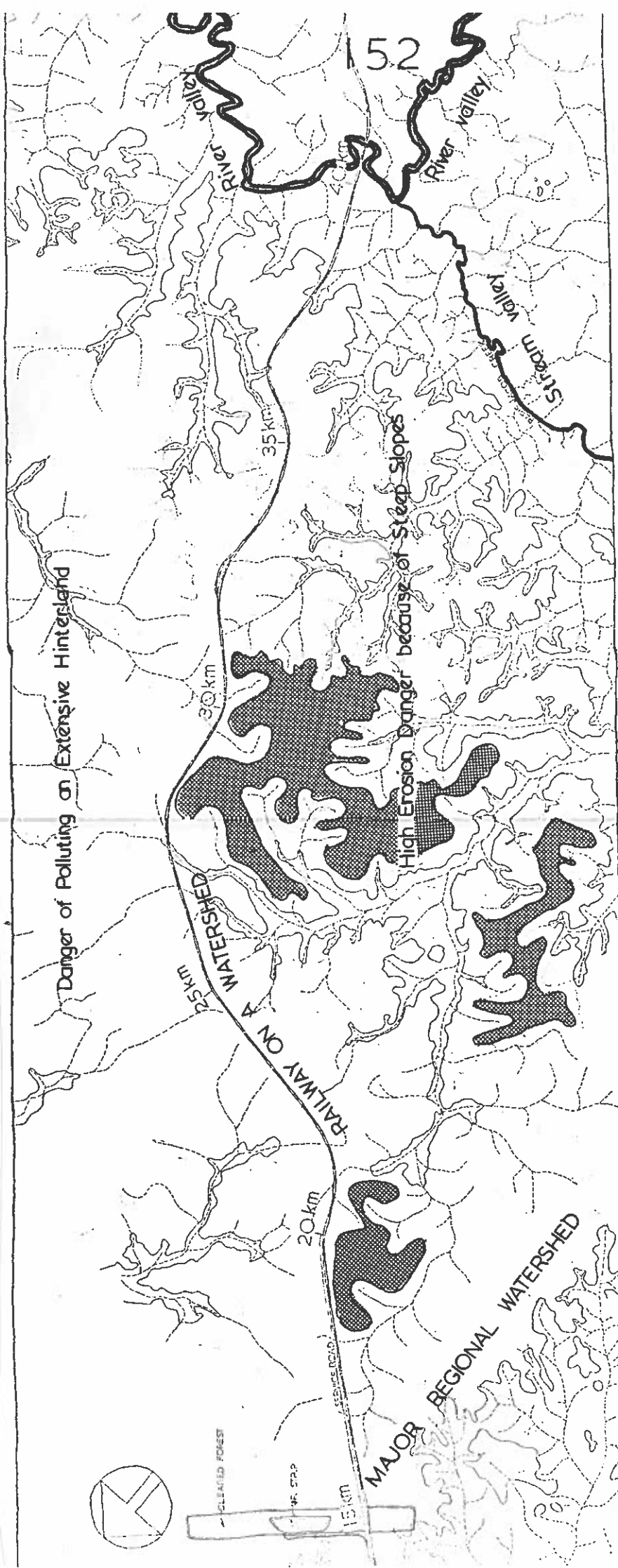


High Erosion Danger because of Steeper Slopes



Pollution as well as Erosion Danger





RAILWAY ZONE

SOURCE AREAS AND STREAMS



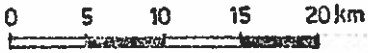
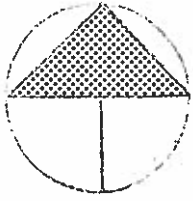
Smaller in-between pockets have a great surface length, and they locate centrally to sources of streams; therefore even they are unsuitable for settlement/activity of any kind.

WEST SURINAME

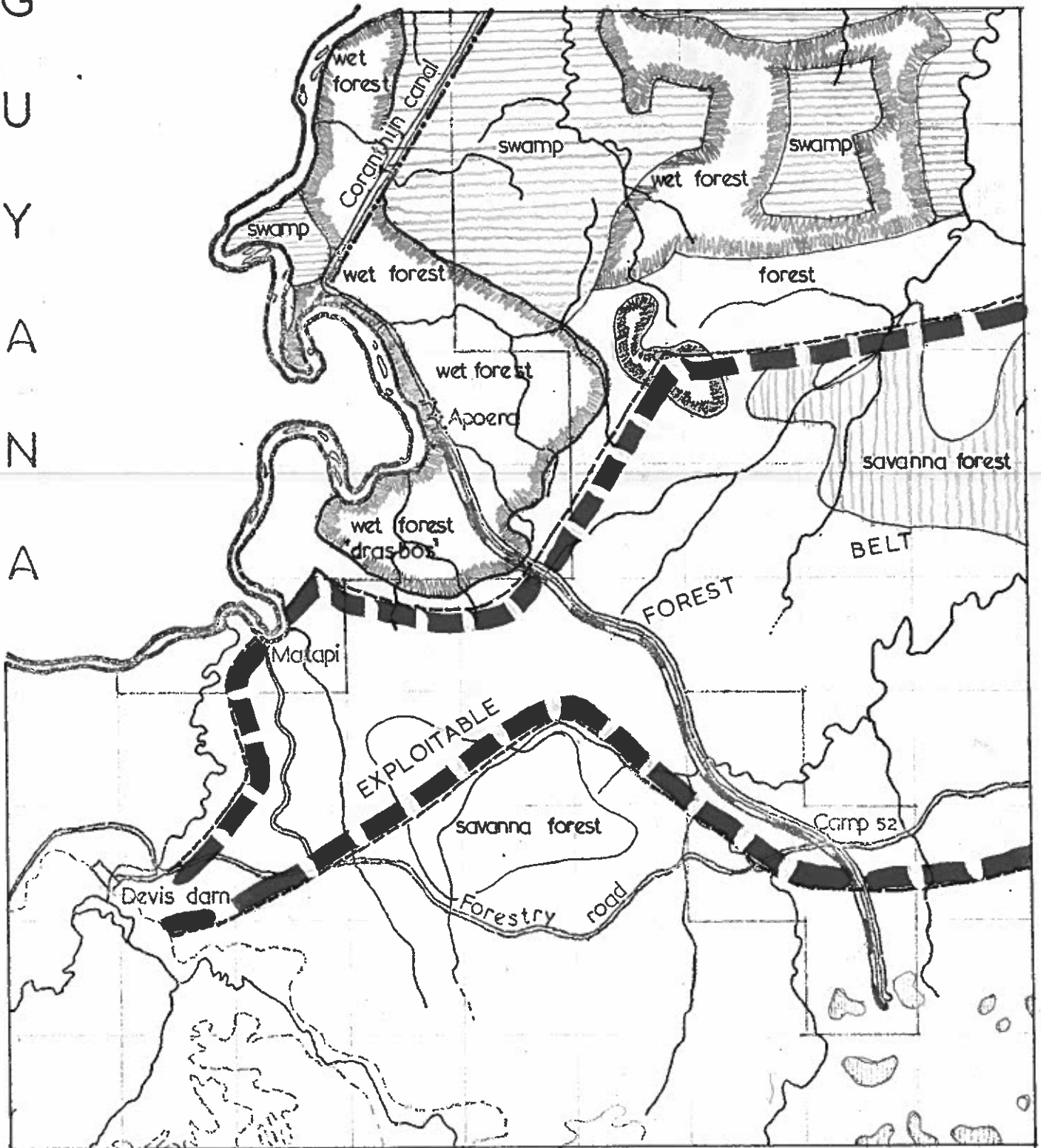
VEGETATION

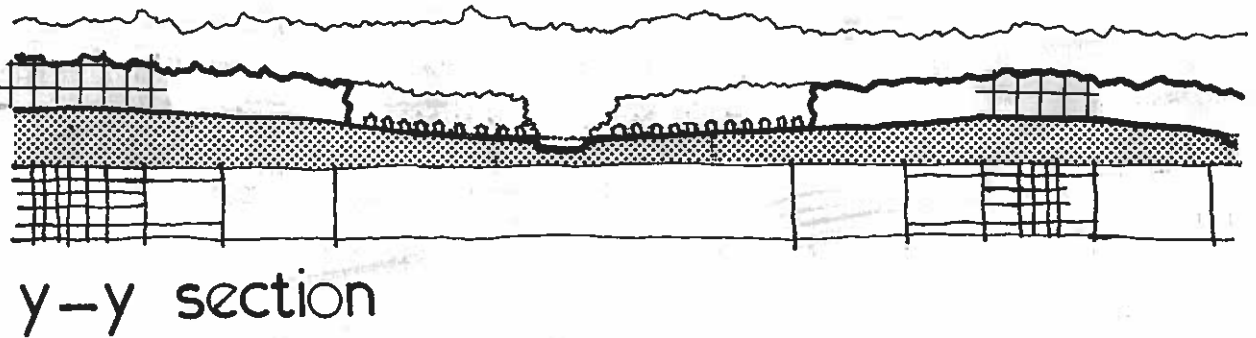
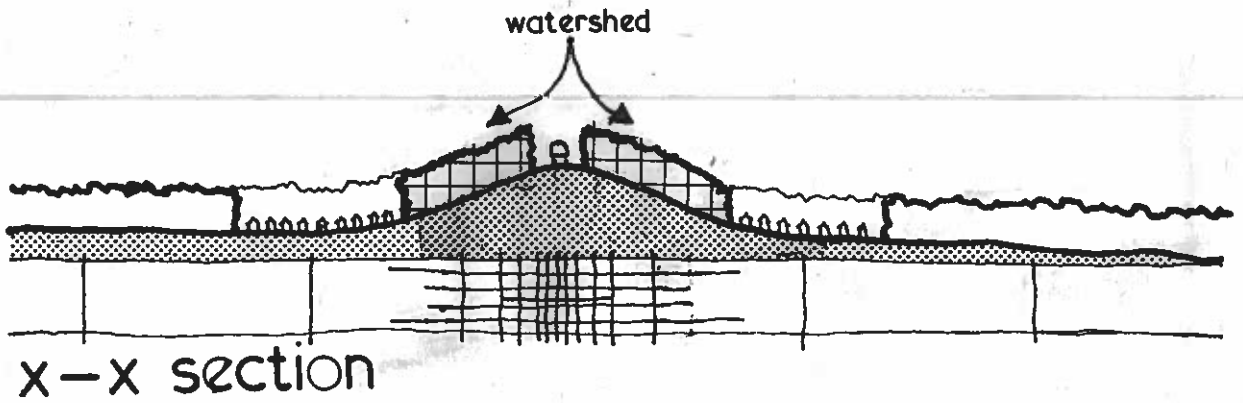
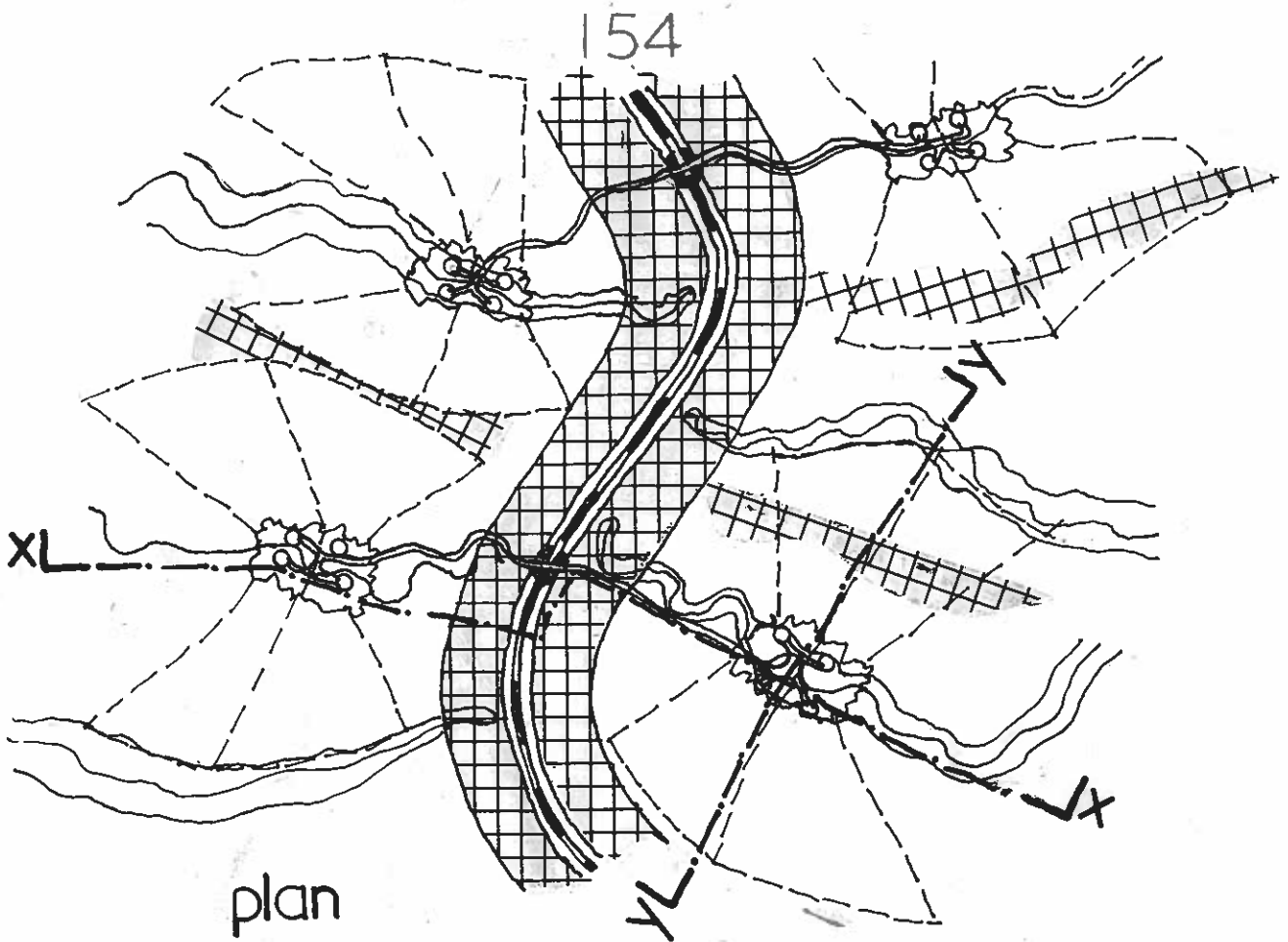
EXPLOITABLE FOREST BELT

SOURCE: Grote Bosatlas 1976



G
U
Y
A
N
A





INTENSITIES physical concept

≡ erosion danger/affect stream source

||| soil infertility

▣ preserve priority: watersheds & rain forest; source areas of streams

Settlement Location

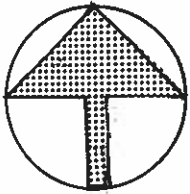
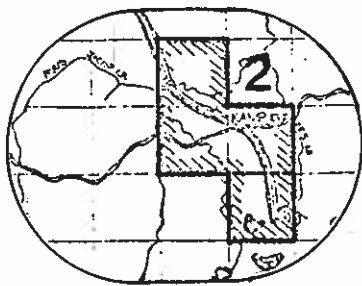
An analysis of the two priority areas indicates possible locations for future settlements. These locations are translated into the concept of a range of settlements, a settlement of specific size/function being located in such a way that it may best fulfill its function in the settlement hierarchical range:

- a rural services centre needs to be central to the 4-8 rural villages it is to serve on the one hand, but it should have good infrastructural/transport links with other rural services centres/towns to enable efficient transport of goods on the other. A town should be central to 3-4 rural services centres, but should also be located such that it can offer an efficient service to its rural services centres -travelling times are important.
- another important locational factor is the service rayon pertaining to various settlements. Should one settlement be located within the service rayon of another settlement, the former settlement will not be able to function independently, in time it will tend to become a kind of suburb (or parasite) on the other settlement, in which case it either becomes subject or object to the other settlement's functioning/influence, I.S.P. West-Suriname (1978).

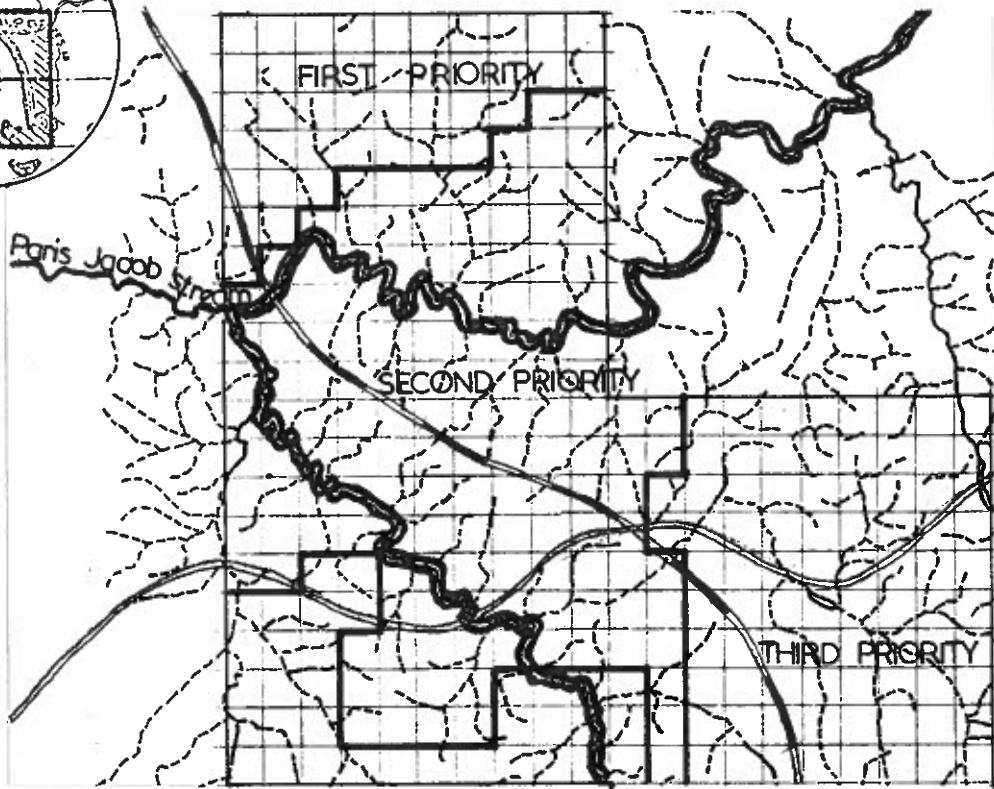
Bearing the above two aspects in mind, a settlement location-possibility diagram (see following page) was set up to indicate comprehensive possibilities for settlement offered by the priority areas.

As may be seen from the diagram the rural services centre may locate at the railway with its service road, specific location being determined by the presence of the river. The terrain is excellent for settlement, the one drawback being slight undulations growing after the railway/Nickerie river crossing, in direction of the mine. Because of the undulating terrain a rural services centre there has been ruled out, whilst a village at this location (where Camp 52 is now) is likely. In total 4 rural services centres can locate in the Nickerie river zone, each services centre being 5 km from its neighbour on average. This distance allows for the possibility/flexibility that any one of the four rural services centres may become a future rural town serving the other three centres.

Further possibilities for settlement location were identified in the vicinity of the Corantijn river. To the south of Apoera a maximum of three village settlements are possible using Apoera as their services centre.

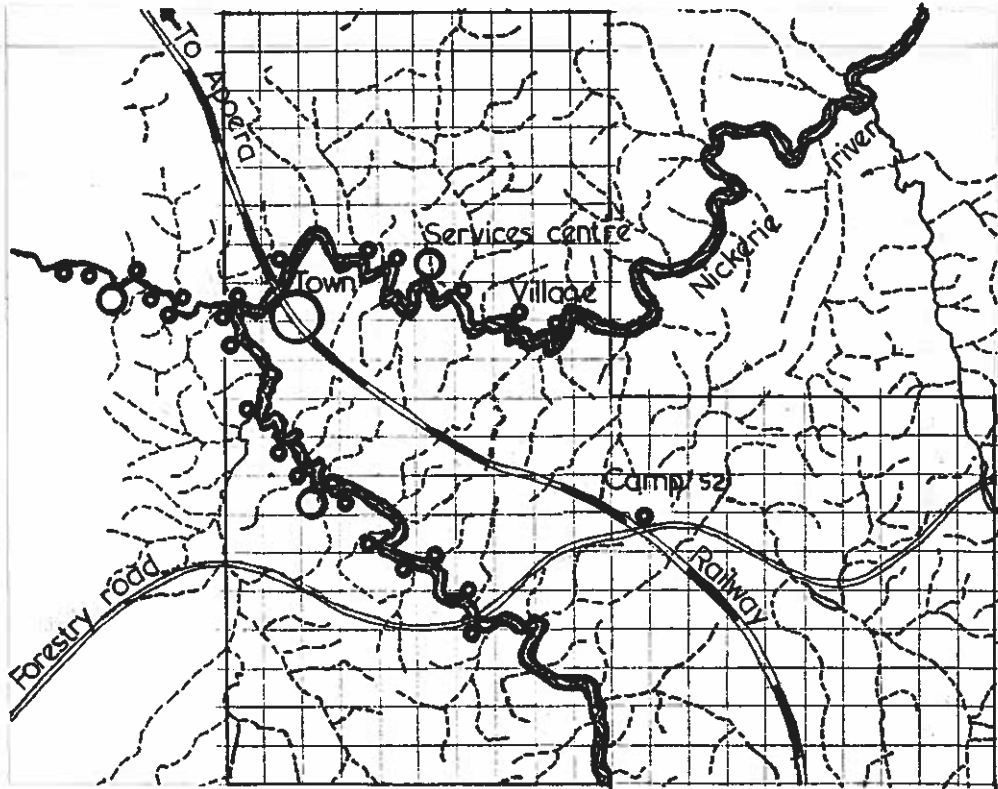


Grid 1 x 1km

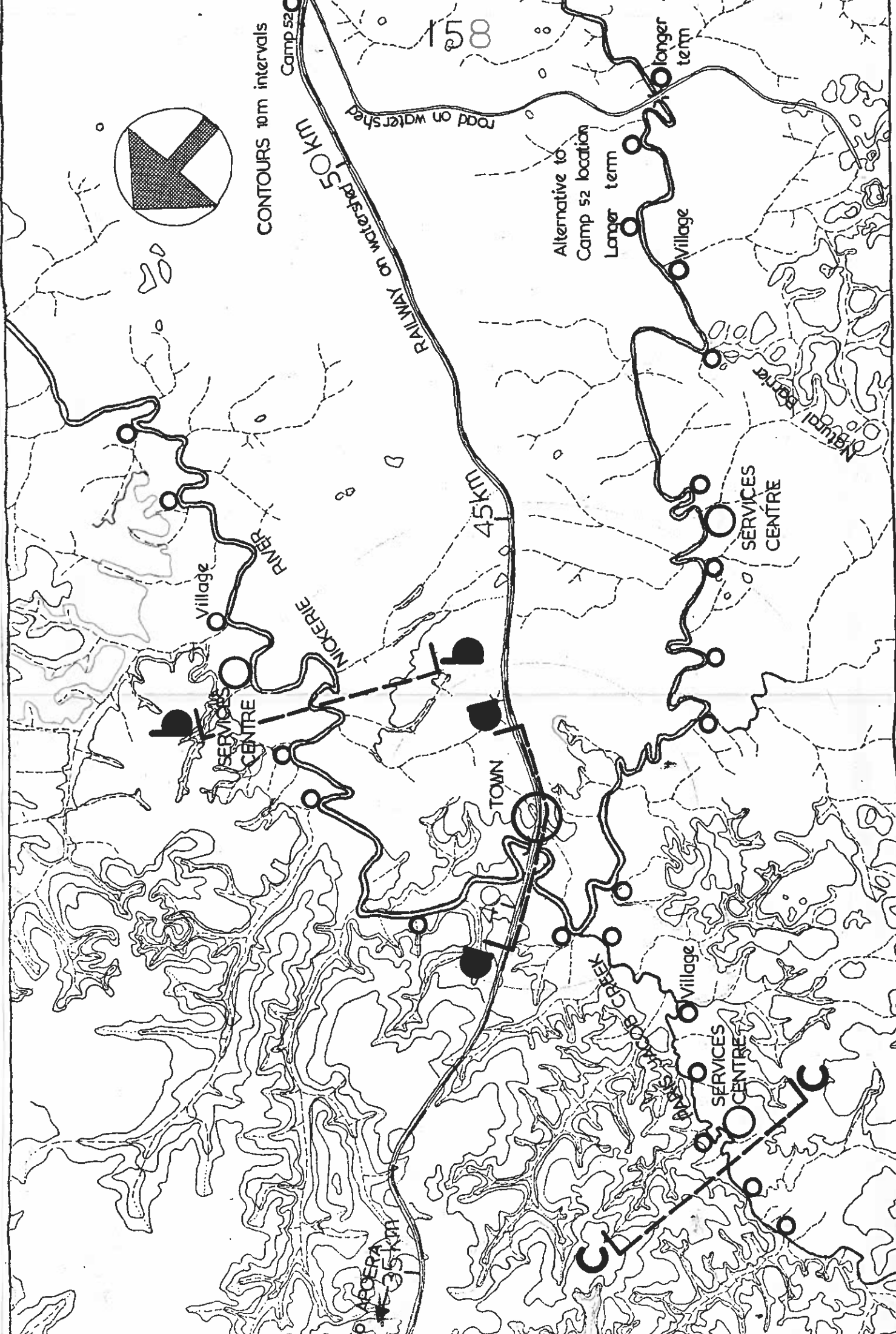


Most suitable settlement areas in Priority Area 2

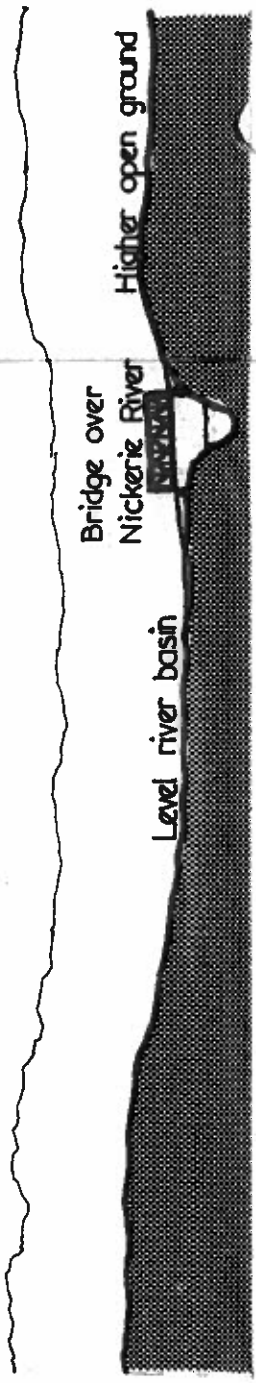
Source: ISP West-Suriname (1978)



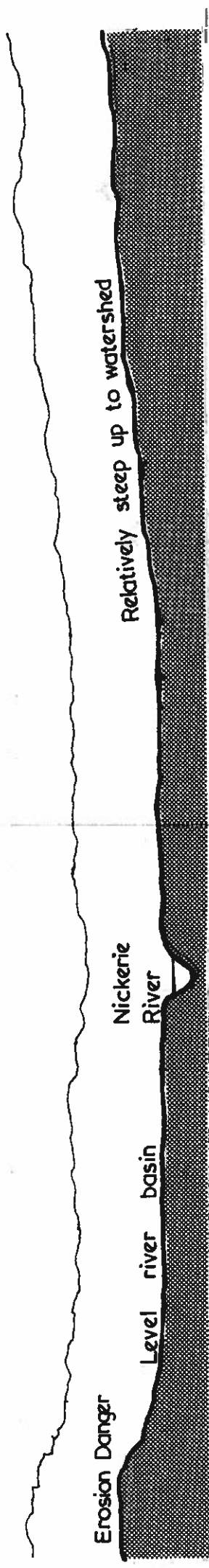
Settlement location possibility diagram for Priority Area 2.



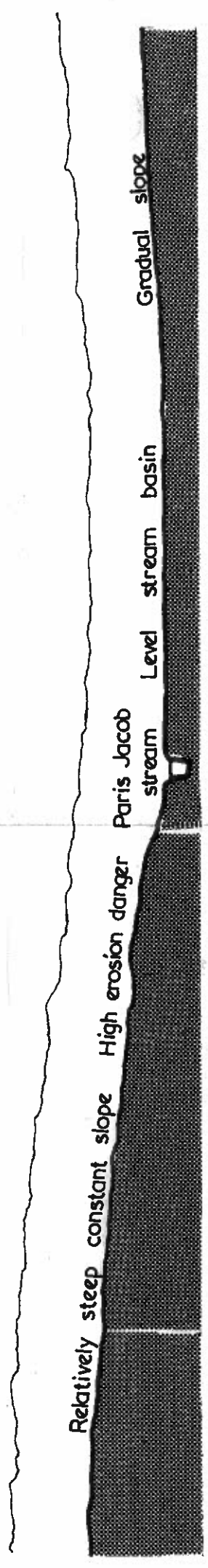
Detail of the settlement location possibility diagram for Priority Area 2



section a-a



section b-b



section c-c

Horizontal scale 1 / 40 000

Vertical scale 1 / 2 500

specific site sections

At Apoera itself only one rural services centre/town is possible because of the limited size of suitable settlement area in its direct vicinity. To the north of Apoera at Wakai a minimum of 4 village settlements are possible using Apoera as their services centre, alternatively one services centre serving four settlements could be established at Wakai. Apoera is selected as services centre/future town without much further consideration mainly because of the advanced stage of existing activity there - the first phase which includes two schools, approx. 100 houses, and an extensive road network, is practically completed. A 'second phase' is already being constructed.

6.4 In review, the total range and number of settlements offered by the comprehensive priority areas are as follows:

Settlement Type	Estimated Number	Location	Total min. no. of inhabitants
Village/Commune	10 (min.6 - max. 15)	Vicinity of Corantijn riv.	2 500
Rural services centre	1 max	Wakai	500
Town	1	Apoera	2 750
'Corantijn' Sub-total	112	As above	5 750
Village/Commune	15 (min.13 - max. 20)	Vicinity of Nickerie riv.	3 750
Camp 52	1	railway/forestry road crossing	500
Rural services centre	3	Nickerie riv.	1 500
Town	1	possibly at railway/Nickerie riv. crossing	1 000
Nickerie riv. sub-total	20	As above	6 750
Regional Total	32	As above	12 500

Note: Average population sizes used for the above tabel are as follows:

<u>Settlement type</u>	<u>Minimum no. of inhabitants</u>
Village/commune	250
Rural services centre	500
Rural town	1 000

A rural services centre is not much larger than a village/commune as it does not necessarily offer more employment and labour intensive activity, members of the village/commune may serve part-time functions in the services centre thereby decreasing the need for services centre employees.

Specific locations of the villages/communes is not possible at this stage, it being advisable to do extensive site investigations to fix best locations. This may be done by experts but choices between locations of similar suitability should be left to representatives of the future village/commune.

Comment

6.5

Flexibility: is possible in the phasing of the range of settlements; in alternative centres of gravity for the future town; in the precise location of villages/communes; in the fact that Apoera needn't become a full-grown town but remain a services centre. The existing infrastructure (railway and its service road) makes much of the flexibility possible, and enables efficient transport to and from settlements. To this end bypass-zones must be constructed at the rural services centre/future town.

Feasibility: is promoted by a more intensive use of the extremely expensive railway line which otherwise is a total loss in the framework of existing plans.

Ecosystem Impact: is limited by the placing of larger urban settlements (rural services centre/town with its industries) at areas where rain forest has already been destroyed i.e. no new areas need be cleared for the new rural services centre (which becomes a future town) and the town at Apoera.

Note: Uncertainties which played a role in the determining of settlement location were systematically reduced by, amongst other means, the three plan studies taken up in the Appendix Report. As these did not eliminate all uncertainties (especially those requiring extensive further study) remaining uncertainties have been grouped and defined in Phase 7.7.

PHASE 7

7.0 The Regional Plan - A Proposed Development

7.1 The Program in Outline

Large scale industry (bauxite mining/production) is to have a reduced effort/investment phasing priority within the region, its production being consciously slowed down to enable the regional base to establish itself and flourish.

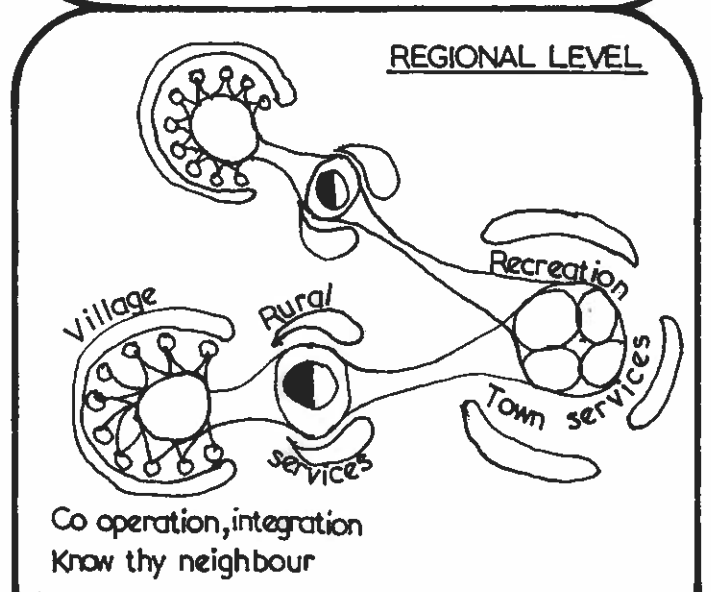
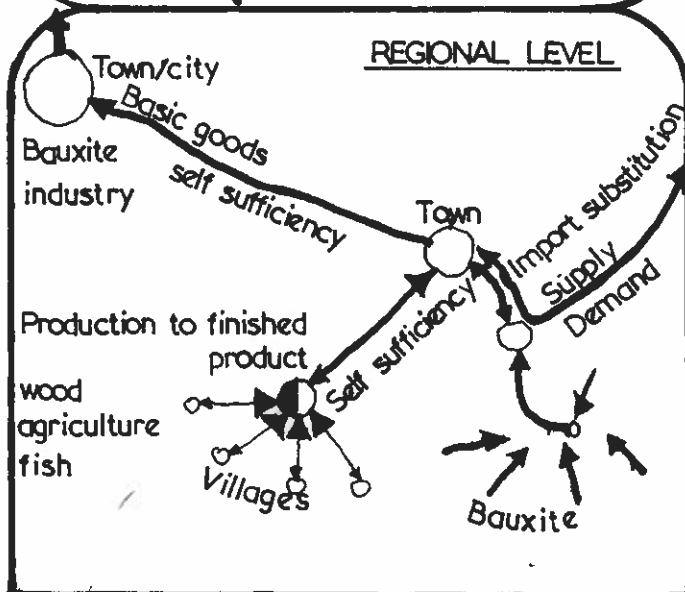
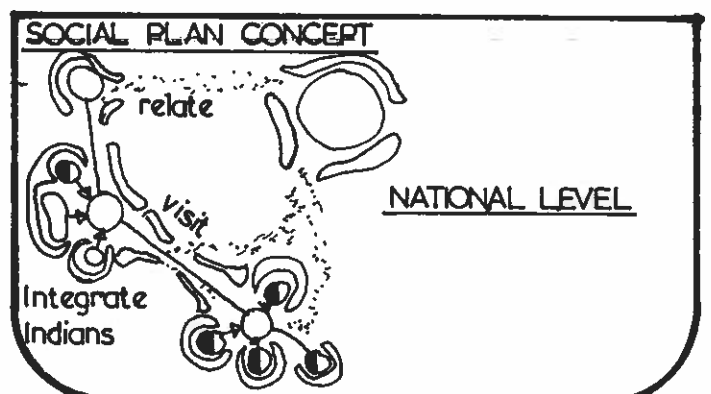
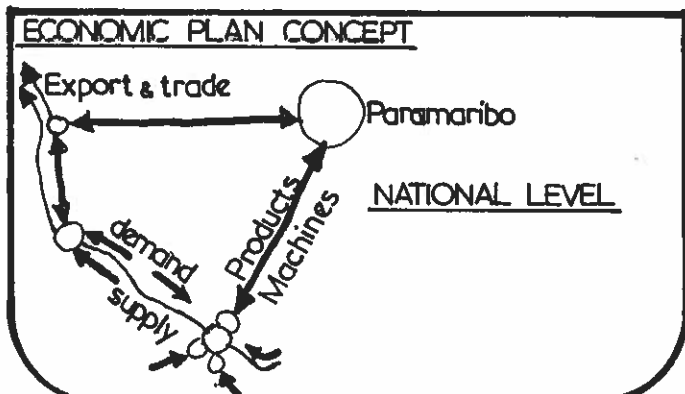
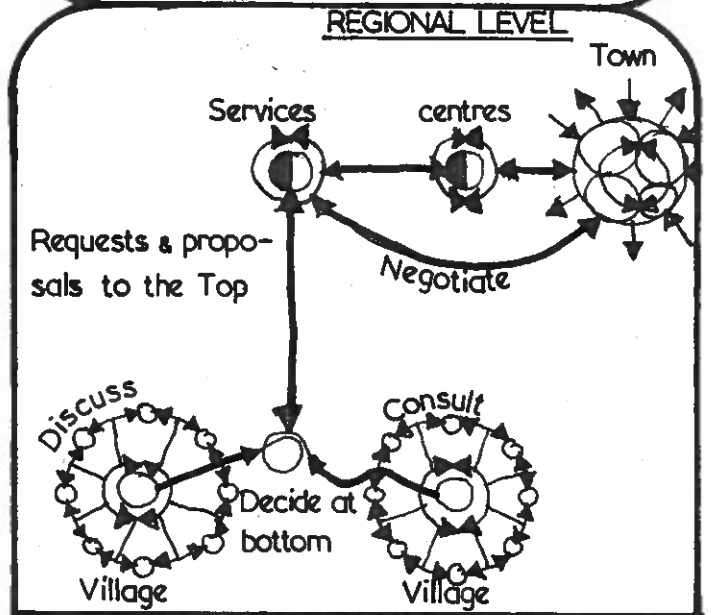
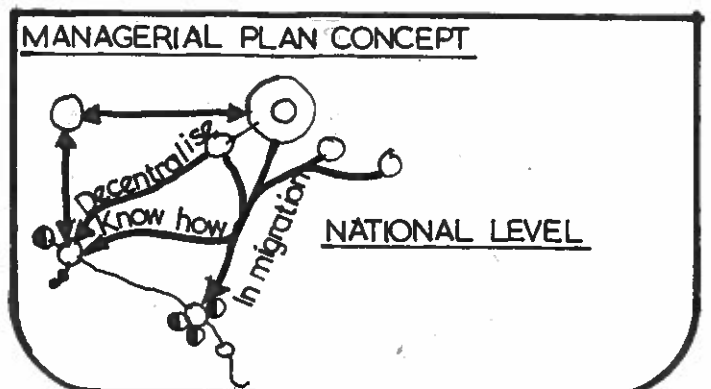
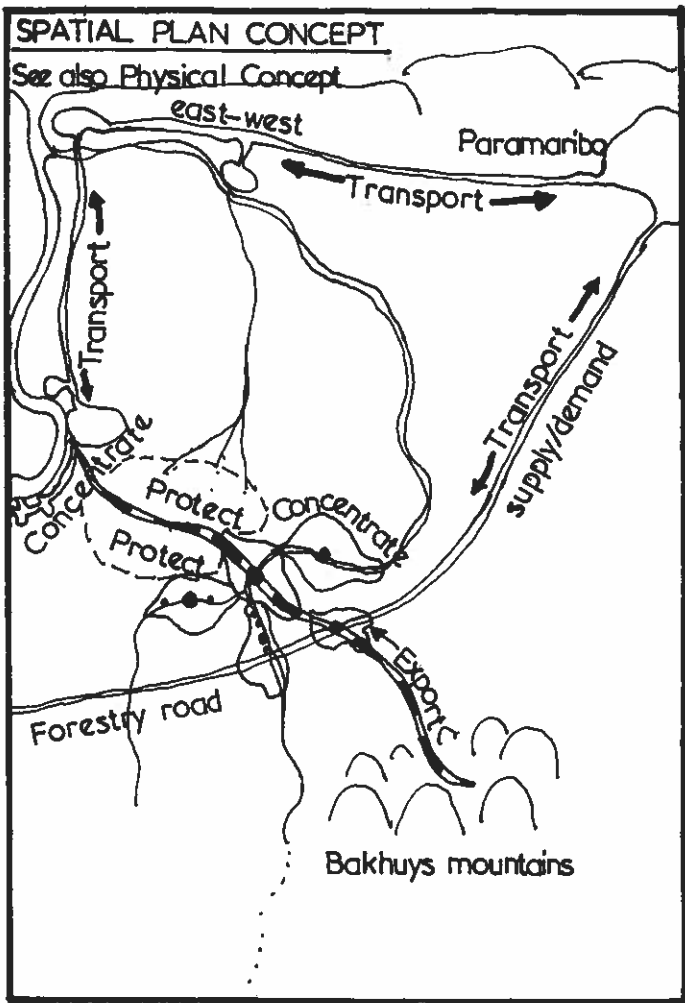
The regional basis includes small scale settlements set up and managed as co-operatives or communes in a village of 10-30 family farms averaging 5 ha each. A rural services centre is located centrally to a minimum of four and a maximum of eight villages, and is established immediately after four villages are inhabited. Its main function is a distribution centre of products, machines, know-how etc., and not as a production centre. A rural town is established on a relatively more favourable location than the rural services centres. Suggestions are made as to its most probable location, but these suggestions are open-ended to anticipate unforeseen regional development which could alter the centre of gravity within the settlement pattern. Areas which are unsuitable for a rural town with regard to the service/market function it offers to villagers and rural centres are indicated.

As bauxite mining/production is inevitable in the region, its presence has to be accepted, consequently the location of the regional town, (small city) at Apoera has also to be accepted mainly because of the advanced stage of implementation of the existing town plans for Apoera.

As with bauxite production, the construction of Apoera is recommended to have a reduced priority and a slower phasing than a present. Recommendations are made with regard to the land- rights of the Indians at Apoera, and their integration/participation in the regional/rural development.

The emphasis of the program is on aided self-help in the initial phases of implementation with the objective of achieving complete economic self-reliance and decentralised rural management in the middle and longer term. In this regard the rural services centre plays a strategic role as guiding stimulating and monitoring centre.

The main types of production envisaged in the program to enable the modernising of the rural areas include rice, tropical fruit (bananas, citrus, etc.) forestry to manufacture products for national/neighbouring use, oil palm for export of vegetable oils (long term) and livestock/fowl runs for regional consumption needs. Fishing and forest by-products form the two main short and medium term complementary village activities.



The presence of large numbers of semi-skilled and skilled mining employees earning substantial salaries provides a substantial market for rural produce. So too does New Nickerie, Paranam to the east and ultimately Paramaribo. Trade with Guyanese across the river is recommended in the program as a stimulus to stabilizing the rural supply/demand production market.

7.2 The Regional Spatial Pattern

As counterweight to the large scale ore-production activities planned for Apoera, it is proposed to establish 13-20 villages/communes in a 6 km (maximum) zone in the vicinity of the Nickerie river. Four rural services centres are to be established in this area at 5 km distances from one another, this distance enabling flexibility in the location of a future town in that its influence rayon does not affect neighbouring rural services centres. Because of difficult, undulating terrain, Camp 52 is not to become a service centre, but an independent centre, (company town) which utilizes existing houses there and is used mainly to house miners and their families working at the Bakhuys mine. The Camp 52 centre could make use of a service centre to the North-west of it along the railway/service road.

Apoera is to have a reduced spatial size (not 30 000), is also being planned as rural services centre for 10 villages/communes to north and south of it in the vicinity of the Corantijn river. Apoera owes its size (approx. 2 800 inhabitants) to the fact that it is a harbour, large scale bauxite industrial complex, centre for large scale agriculture, long term services centre to the 10 villages.

Exact locations of villages in the 6 km Nickerie zone are to be determined by site analysis and ultimately the decision of the future commune or villagers. Minimum distances of one km and maximum distances of four km between villages should not be exceeded to enable easy contact by bicycle, small bus and even walking. A suitable average size of a village commune is thought to be 250 inhabitants.

One Village/Commune consists of:

(Source: I.S.P. West-Suriname; Surinamese Planning Service; Policy Paper on Health Care in Suriname 1976-1980)

30 family farms at 5 ha avrg. each = 150 ha or 1 x 1,5 km

2 forestry selective cutting/cultivation units of 15 men maximum each.

Agricultural co-op run by the farmers.

Communal storage/transport depot.

An emergency sick bay.

1 grocery store (all-purpose)

1 child play space

Total estimated village area = 1 ha (100 x 100 m)

The rural services centre (which serves 1 750 people including its own inhabitants) consists of (source as above, total served population being 2 000 on average):

2 daily-use shops (grocer, dairy)

2 all-purpose shops (hardware, dispensary, clothing, seeds)

1 restaurant and 1 petrol station (perhaps combined)

1 small post office, telephone exchange and 1 bank.

1 development-guidance centre (extension worker)

1 saw mill with 10 employees at every second services centre.

1 poli-clinic with a doctor and two nurses for every second services centre

1 multi-functional community centre (500 m²)

1 small harbour/jetty with loading platform and storage facilities

1 primary school with 5 classes and 1 nursery school with 3 classes

1 high school with 8 classes in every second rural services centre

churches per denomination as required

Total estimated services centre area = 2 ha

The rural town at Nickerie river which serves a rural population of 5 000 including its own town's folk of 750-1 000, consists of:

6 shops for daily use

3 clothing stores

6 all-purpose shops

1 restaurant and 1 petrol station (perhaps combined)

1 town market (1 large one at Apoera)

1 small post office, 1 telephone exchange and 2 banks.

5 livestock, dairy and/or crop farms =, 50 ha

1 police station with 3 policemen

1 fire station with 2 firemen

5 carpentry workshops.

1 poli clinic with 1 doctor, 3 nurses, maternity ward and ambulance

1 dentist

a library

a 700 m² community centre

a theatre/cinema

one creche and a nursery school with 3 classes

one primary school with 6 classes

one high school with 4 classes, 2 football fields and a small swimming pool.

1 technical school for the acquiring of agricultural and hand craft skills in the district.

Total area town = 3 ha

As the population size of Apoera is estimated as ultimately being 2 750 - 3 000, the figures in the above list for the railway rural town may be tripled (not in all cases!) to arrive at appropriate figures for Apoera.

Total area of Apoera = 6 ha

Regional Transport Routes

The road network being constructed in the region at present is adequate for supply to and delivery between rural services centres and two towns. The forestry road provides a 250 km link to Paramaribo (from Camp 52) and the railway and Corantijn Canal service roads an 80 km link to New Nickerie (from Apoera). Needless to say the latter connection to New Nickerie, also possible by 5 000 ton boat on the Corantijn river, will become the most important and frequently used of the two roads, as it cuts the distance to a sea harbour/populated centre by 65%.

Roads between services and villages, as well as villages and villages, are to follow natural contours and be hardened top-layer, asphalt roads being too expensive in the initial development phases.

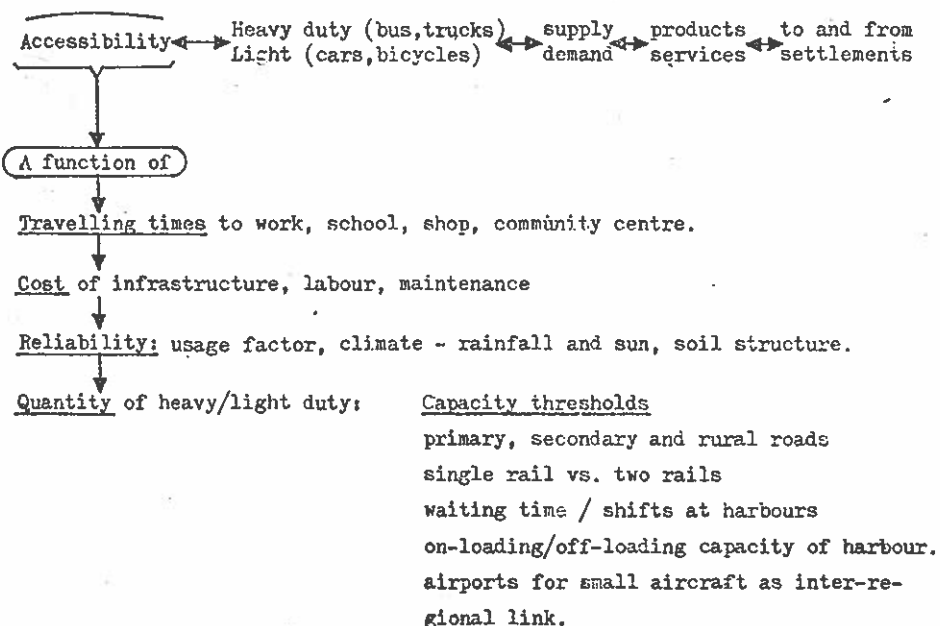
Forestry Road: At present the road most used for transport between Paramaribo and West-Suriname is the laterite surfaced forestry road of 7-8 m wide. Ditches and grooves occur in its surface from time to time and its efficient use (100 km/hr speed) is possible only with frequent maintenance (scraping the surface to level it). Laterite is sprinkled on the road to harden it, but dust clouds are still a problem. The road is the possession of the Surinamese Forestry Department as it was initially made for forestry purposes. It is the intention that the future main road connection to West-Suriname be the asphalted East-West at the coast linked to Apoera by a road next to the Coranthijn canal, the forestry road being used solely for forestry purposes.

The railway and its Service Road A strip has been cleared in the forest of approximately 150 m on either side of the railway line - this to prevent falling trees from obstructing either rail or service road. The service road is 6 m wide and is also surfaced with laterite. At Camp 52 the road narrows to 4 m as it is still under construction there. At 6 m width two small trucks can pass one another at speed - small undulations in the road require maintenance at specific intervals, which depends on the amount of traffic and rain fall.

The railway, with its single track, and four bypass zones, has to cater for uni-directional transport only (mine to Apoera) in the framework of the existing plans. The rolling stock to be acquired for this transport includes: 4 main locomotives, 120 ore wagons, 2 motor wagons and two shunting locomotives. A transport study is required to determine to what extent this existing rolling stock may be used for other transport - agricultural produce and small industrial products (to receive priority above human transport which is to occur by road - see page 168. Because of delays in construction of the Kabalebo Dam, the railway will work at its design capacity at a much later date. In this short term period (say till 1985) the present regional plan may be implemented and tested, hopefully making use of the under-utilized railway and its running stock in this period.

This is made possible by the fact that the completion of the railway is scheduled to occur long before it becomes necessary. In effect, the railway should have been the last element to be constructed in the framework of existing plans, but because of rapid construction by Morrison-Knudsen Suriname, it seems as though it will be completed long before it is actually required.

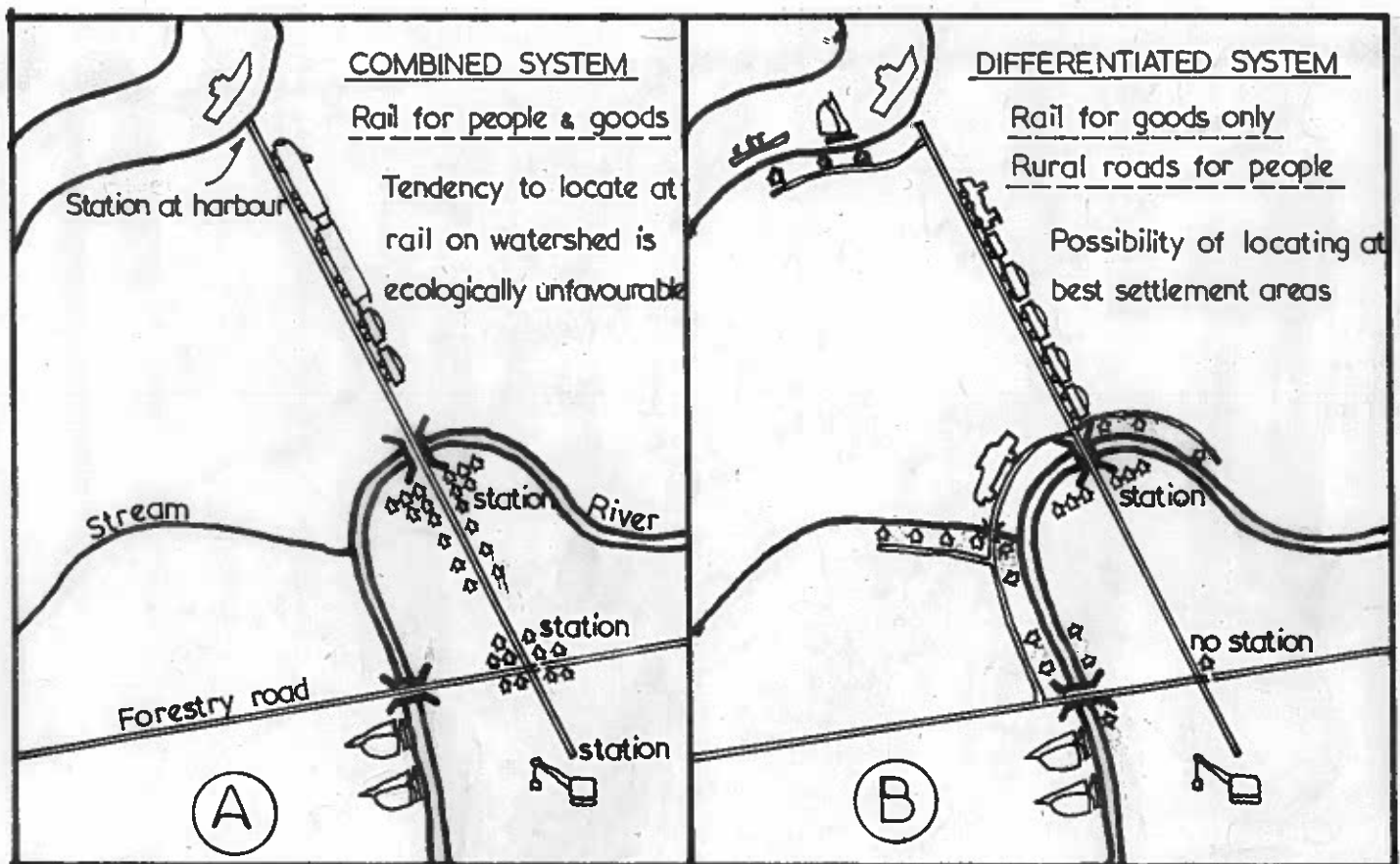
Towards an Integral Transport Plan for the Region



In the following two pictograms two alternative regional transport strategies have been visualized. In A, the use of the railway for transport of both people and goods (combined use) is seen to be inefficient and therefore discouraged. A minimum of four new railway stations need to be constructed at settlements on the railway. As the railway has only a single track, the risk of overloading the transport system is great, a prospect which results in either inefficient transport or the need to build a second railway track at great extra cost.

Preference is given to B, in which transport is differentiated into two main systems - the rural road network which may flexibly serve travel needs of regional inhabitants, and the railway which is used solely for transport of (export) goods to the harbour at Apoera. By differentiating these two systems the use-efficiency of each system is improved - the railway transports heavy goods only at its maximum capacity/efficiency, and the flexible road network is adapted to changing human needs/social desires between settlements, sub- and inter-regionally.

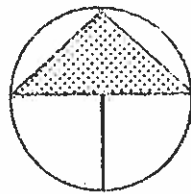
As B is proposed, it is obvious that the temporary mining contractor's Camp 52 will stagnate in preference for attractive villages on the banks of the Nickerie river. This is seen as no great loss, as the temporary facilities at Camp 52 may be re-used in these future villages, where ample water and recreation opportunities are available.



Maximum/Minimum Range of Travelling Distance Enabling Efficient Transport Between Settlements per Travel Mode

Travel distance Travel Mode	Village ←→ Village		Village ↔ Services Centre		Services Centre ↔ Town		Town ↔ Town	
	1 km minimum	4 km maximum	2 km minimum	8 km maximum	6 km minimum	24 km maximum	15 km minimum	50 km maximum
Pedestrian	11 minutes	50 min.	25 min.	90 min.	70 min.	-	3-4 hours	-
Bicycle	4 min.	15 min.	8 min.	30 min.	25 min.	90 min.	60 min.	-
Motor bike	2 min.	7 min.	3 min.	15 min.	12 min.	40 min.	25 min.	90 min.
Car	1 min.	4 min.	2 min.	3 min.	6 min.	20 min.	15 min.	45 min.
School Bus/ Truck	-	5 min.	2 min.	10 min.	8 min.	20 min.	30 min.	50 min.
Train	-	5 min.	2 min.	10 min.	8 min.	20 min.	15 min.	45 min.

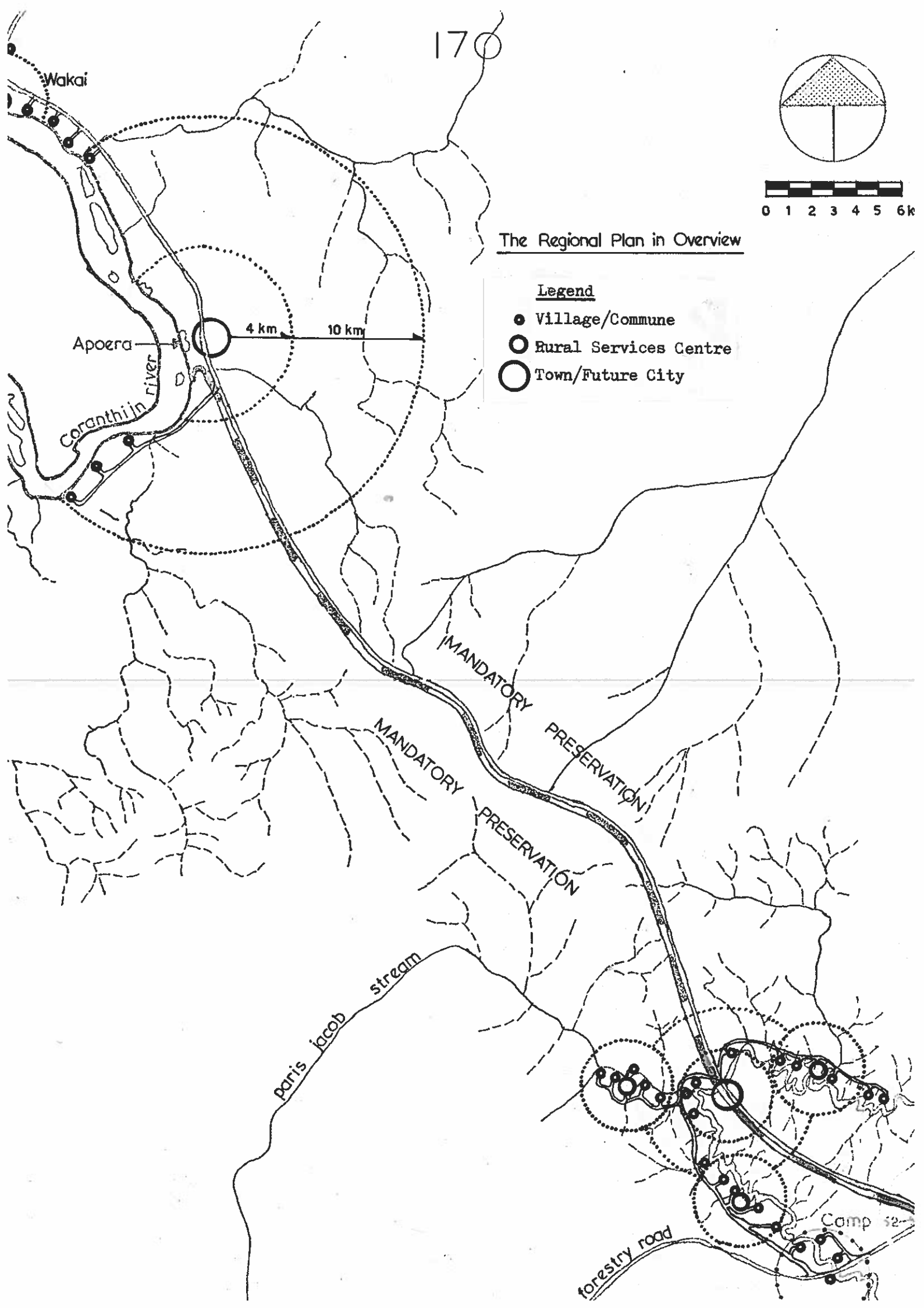
Source: Adapted from Van Dusseldorp, I.S.P. West - Suriname and Rehovot.



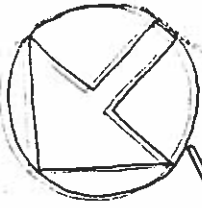
The Regional Plan in Overview

Legend

- Village/Commune
- Rural Services Centre
- Town/Future City



The Regional Plan Detailed --- Priority Area 2



Village camp 52

172

1.5 km
Mandatory preservation

1.5 km
Mandatory preservation

Alternative
Future villages
to Camp 52,
5 km GMDY

Small Scale Agriculture

TO DEVIS DAM

FORESTRY boundary

Small Scale Agriculture

Services centre

FISH

4

Services centre
Future TOWN

2 km

Existing service road

4 km

4.5 km

2 km

NICKERIE RIVER

Village/Commune

Services centre

5

Livestock

RECREATION

AGRI-FORESTRY

Fisheries

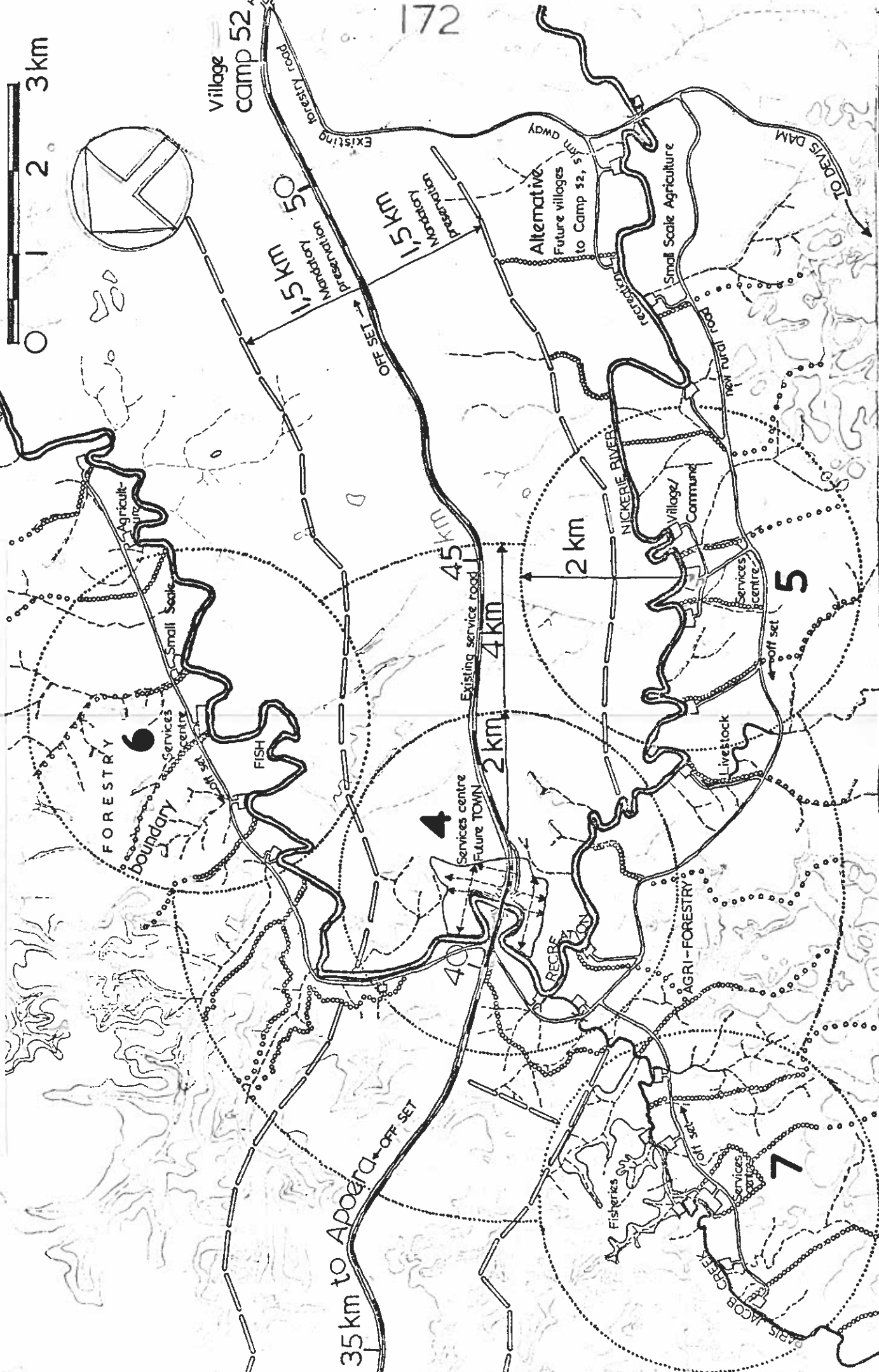
Services centre

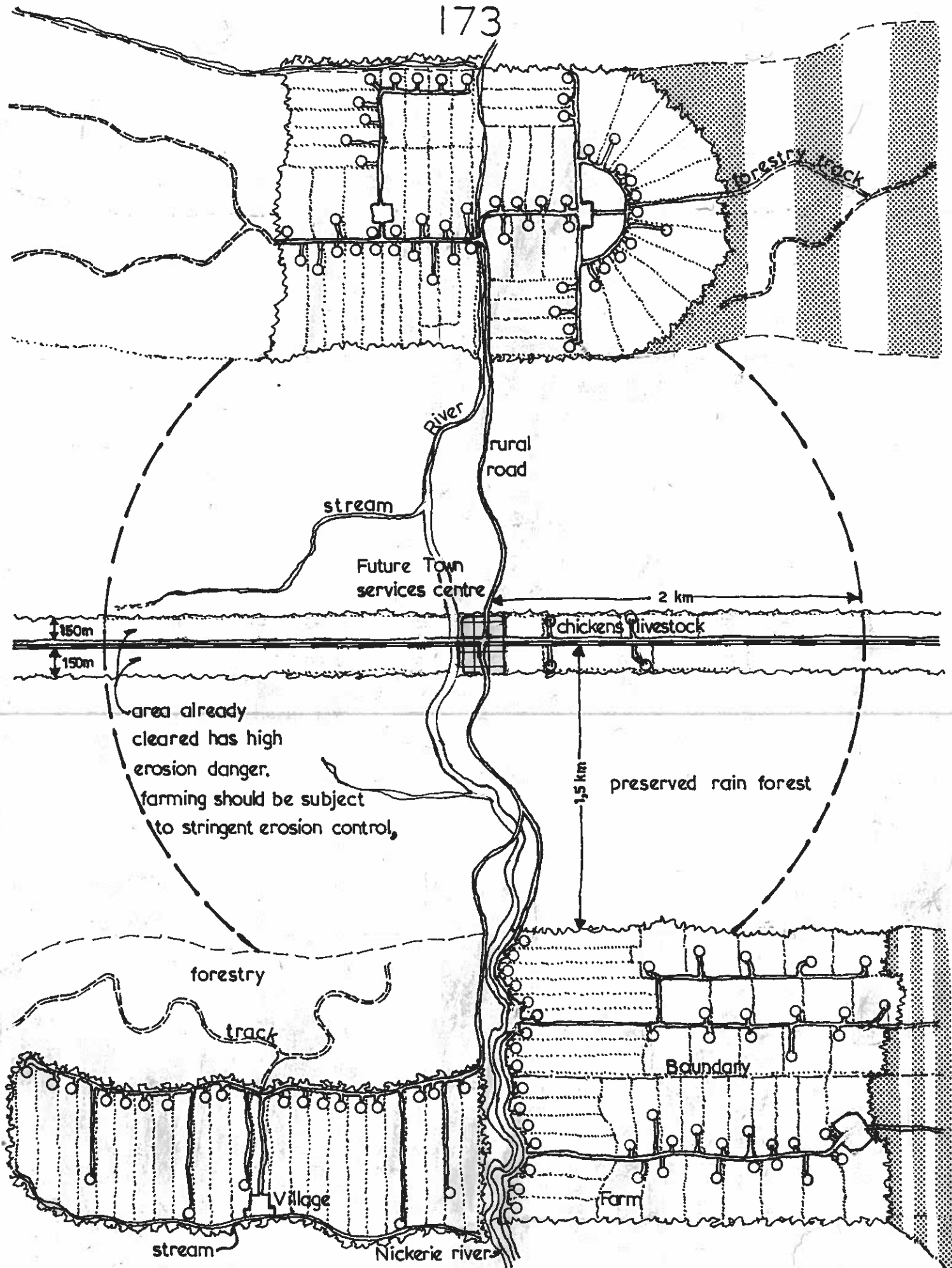
7

ST. JACOB CREEK

35 km to Apoera OFF SET

Existing forestry road
TO PARAPARANGA





Possible Variations in Detailed Layout: Services Centre and Villages

Water Supply

All proposed settlements have been located at main regional rivers and streams for constant water supply. Rain water collected/filtered from roof run offs is to supply settlers with their household needs. The streams are to provide the irrigation requirements of the farmers; small dams constructed in them may ensure a constant supply. Wells are not to be used because of the effect on sub-soil water --- the rainfall is ample. Irrigation canals or piped supply from the Coranthijn and Nickerie rivers to farm lands provide a constant fresh water supply for agricultural purposes. Adapted irrigation technology is to be designed by water engineers.

Infrastructure

The spine of the settlement structure is provided by existing major regional rivers, the railway forming a link between the comprehensive priority areas, as identified in the Regional Specific Analysis.

Rail transport frequency should closely follow production (bauxite, small industry or agriculture) development/requirements.

Transport between villages - villages; villages - services centres should occur via a rural road system the spine of which is the present service road.

Infrastructure should be of medium to high quality (in comparison with existing standards in Suriname). Electricity could be generated by diesoline generators at all settlements until such time as the hydro-electric electricity from the Devis dam becomes available.

Cultivation

Crops which have been proved suitable by a crop-testing station are to be cultivated in the vicinity of the village/commune where rain forest has been cleared. Where possible existing topography should be maintained. The use of agricultural machines may be supervised by an extension worker and a committee of local farmers. Large scale agricultural production may be crop-tested in the vicinity of Apoera where the vegetation is not rain forest but 'drasbos' or moist almost swampy forest (Grote Bosatlas, 1976). Possible large scale crops (still to be tested) include oil-palm, rice and citrus. Each village is to be self-sufficient as far as possible, as well as supplying services centres, towns, New Nickerie and even Guyanese across the Corantijn with their daily needs.

New Nickerie offers a market for fruit and vegetables as its (large scale) agricultural produce is limited to rice, citrus and bananas.

In the report of the I.S.P. West-suriname 1978, an estimate was made as to the number of hectares as well as the number of farms required for the self-sufficiency of 1 000 people in West-Suriname.

Crop/Livestock/dairy products	no.of hectares	no.of farms	no.of labourers
Rice	40	2,5	1,5
Sub-soil crops (Potato, carrot)	1,2	0,05	0,05
Sugar	11	-	-
Fruit	1,2	0,05	0,05
Vegetables	1,2	1,2	1,2
Bananas	0,4	-	-
Citrus	2,6	0,5	0,5
Beef/mutton	N.A.	0,3	0,6
Pork	N.A.	0,5	1,0
Chicken run	N.A.	0,6	0,6
Eggs	N.A.	0,4	0,4
Milk	N.A.	0,8	1,6
Total	100(3,5x3km)	7	8

Vegetables, sub-soil crops, fruit and bananas should all be cultivated on one farm (mixed cropping) as the latter three crops cannot provide enough productive labour for self-sufficiency of the regional population. West-Suriname could make an especial contribution in the self-sufficiency of the whole of Suriname with regard to meat (beef, mutton and pork) requirements -- I.S.P. West-Suriname, 1978.

According to the Long term Integral Agricultural Development Plan (MIAOP) 1977, production best suited for export is rice, citrus and vegetable oils, (oil palm). Rice may be cultivated best at New Nickerie, but both citrus and oil palm could be cultivated on the sandy soils in West-Suriname.

However, this depends greatly on the outcome of agricultural tests still to be carried out in the region; as well as a thorough evaluation of supply/demand and off-set markets.

The railway has been located on a natural topographical ridge which forms a watershed. It may be assumed that the soil-fertility at the railway is not as high as further away from it. This needs to be verified by site tests upon which advantages of slightly less fertile soil near a quality transport system should be compared to the disadvantages of increased soil erosion possibilities on the watershed, (see Physical Concept).

Agriculture and Livestock at the Settlements

Villages/Communes in the Nickerie river zone: Vegetable gardens at all communes for their own self-sufficiency. Fixed requirements for 250 (min.) persons are:

Sub-soil crops + Fruit + vegetables + citrus + bananas	1 farm	2 ha
Beef / mutton Dairy (milk)		7 ha 3 ha ← 2 farms
Rice (at Wakai)		10 ha ← 2 farms
Sugar		3 ha
Total		25 ha

If the present average small farm size of 3-4 ha, Brandsma (1975), is increased to 5 ha, then 3 farms are required e.g. 1 farm for fruit, vegetables, citrus and sugar cane and 2 farms for beef/mutton and dairy produce. All regional rice requirements are to be met by production in Wakai, the only local area suitable for rice production. This represents minimum requirements for 250 persons, i.e. the minimum number per commune.

Milk and meat could be produced to cater for the needs of all Suriname, which has a shortage at present - I.S.P. West-Suriname (1978). Small scale agriculture for self-sufficiency can offer extended employment opportunities by catering for self-sufficiency of West-Suriname and Suriname - sub-regional markets at Apoera (min.3 000), Camp 52 (min.600), the town at the railway/Nickerie riv. crossing (min.2 000) and inter-regional markets (New Nickerie, Greater Paramaribo) offer employment to half the village population, the other half being employed in the forestry sector. NB: Subject to testing.

Villages/Communes at Wakai: Rice farms for self-sufficiency of West-Suriname may be set up between the river and the Coranthijn canal. Minimum required area = 460 ha = 90 5 ha farms. Meat, fruit vegetable and dairy requirements at Wakai are also approximately three ha a village of 250. In addition, pigs and chicken runs may be kept at the Wakai settlements. The favourable location of Wakai (good soil quality; at the Coranthijn irrigation canal; at short distance via river or road to New Nickerie) stimulates agricultural production.

The Railway Town: Large scale oil palm and citrus, best cultivated on sandy soils, could form the main agricultural production of the town.

Self-sufficiency is soon met with, so export possibilities should be investigated. At present all that can be said in this regard is that further research and feasibility studies are required to verify/falsify the need for export production, which is seen as a long term possibility.

An abattoir in the town with a cold store, as well as one cold storage railway buggy could facilitate production and supply of meat to services centres, Apoera and New Nickerie.

Forestry - Introduction

Because of extensive areas of mora and krappa tree species, West-Suriname is more favourable for forest exploitation with an average of 30-35% of commercial trees per hectare, compared with the rest of Suriname average of 18% commercial trees per hectare, Work Group West-Suriname (1977).

If it is borne in mind that "..... the first phase of the production chain charcoal - chips - pulp is fairly labour-intensive, we have with this form of forest exploitation an almost ideal combination of labour as well as capital-intensive (with pulp production) process, that knows a substantial added value and fairly sure (open) off-set market", I.S.P. West Suriname, 1978.

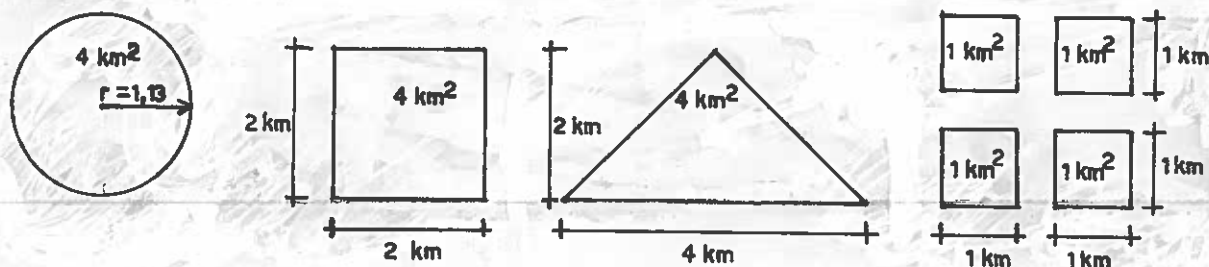
As may be seen in the vegetation diagram the railway lies for more than half its length in the exploitable forest belt. This means that all planned Nickerie riv. settlements, including Camp 52, lie within the exploitable forest zone.

The combination of available quality infrastructure (the railway and future harbour) and exploitable forest with twice as many commercial trees per hectare than found in the rest of Suriname, suggests that a main activity of a Nickerie river zone settlement, besides agriculture should be forestry. In this regard the large scale clearing of forest is ruled out by the small size of the labour force available in each village and services centre. Two types of forest clearing are envisaged:

- a) Permanent clearing: When the location of a village has been fixed, that site and its related farm area for self-sufficiency (20 ha minimum) is to be partially cleared. The creation of rural roads will require permanent clearing of a 100 m strip on either side of the road.
- b) Clearing and re-planting: Natural growth cannot be relied on for growth of forest on cleared areas, therefore planting of selected species in strips should occur on cleared areas. All clearing areas are to be carefully selected and their surface length kept to a minimum. Experience of

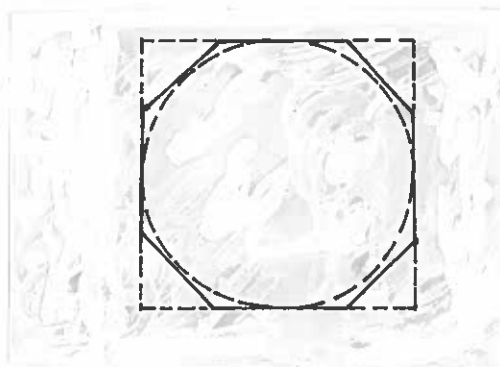
forest-exploiters (e.g. Bruynzeel, Suriname) is invaluable to learn from, and apply in each village in West-Suriname. As with agriculture a forestry testing-station should be set up to determine which species are most suitable for planting in West-Suriname. In this regard profit maximization is to take second place to spatial factors such as countering of erosion, contributing to maintenance of the moisture cycle, etc. Attention must be given to the sensitivity for soil erosion of the cleared areas, the tendency to form savannas and in the last instance the hardening of the area into laterite layers - a phenomenon which renders the soil utterly useless, endangers the envisaged multi-functionality of the settlement production zone, (agriculture/forestry) both at the Coranthijn river and in the railway zone. (See Forestry Discussion, Appendix Report).

As regards surface length of cleared areas, the following theoretical study indicates which clearing patterns have relatively the shortest surface length.



Surface length = 6,5 Surface length=8 Surface length=9,7 Surface length=16 km

If 4 km^2 has to be cleared, the shortest surface length is offered by a circle with radius 1,13 km. As perfect circles are difficult to obtain in practice with machines, this is an impractical clearing pattern. The next best pattern is a square of $2 \times 2 \text{ km}$ followed by a triangle $4 \times 2,8 \times 2,8 \text{ km}$. By 'rounding' the corners of the square advantages of shorter surface length may be combined with partial clearing methods.



Forestry - Exploitation

Selective cutting: Commercial species of suitable size are to be located in the forest and logged. This provides immediate, short-term employment for regional settlers. All major watersheds and sensitive source areas are to be excluded from selective cutting. Complete removal of any one species is prohibited.

Natural Rejuvenation or Refining: The growing rates of commercial species in the rain forest is speeded up by eliminating taller non-commercial trees around the commercial species. In this way the desired species grow more rapidly as they receive more sunlight and moisture. This system is ecologically preferable to complete clear cutting - (Goodland & Irwin 1975), and should be initiated as soon as possible.

Strip Planting: Suitable commercial tree species are planted in partially cleared strips within the rain forest. The existing forest canopy is maintained and gradually removed as the planted trees increase in size. This system requires more intensive labour than forest refining but provides much more commercial wood per hectare - Encyclopaedia of Suriname (1977).

Forest Enrichment: Being the combination of forest refining and strip planting, is forwarded as the most suitable future forest strategy for the region. Forest enrichment provides short-term (controlled selective cutting) and long-term (strip planting and refining) employment for regional settlers. The complete removal of the forest canopy is to prohibited within the entire region, as from all accounts such removal of shade would render soils unstable, infertile and erosion prone - Goodland & Irwin (1975) and Dasmann (1976) amongst others. Agriculture, forestry and all complementary activities are to occur under a fully or partially preserved forest canopy to ensure continued soil fertility, guard against soil parchement and counter soil erosion.

Complementary Activities

Complementary activities which are possible in the region and provide diversity/strength to the regional economic base include the following:

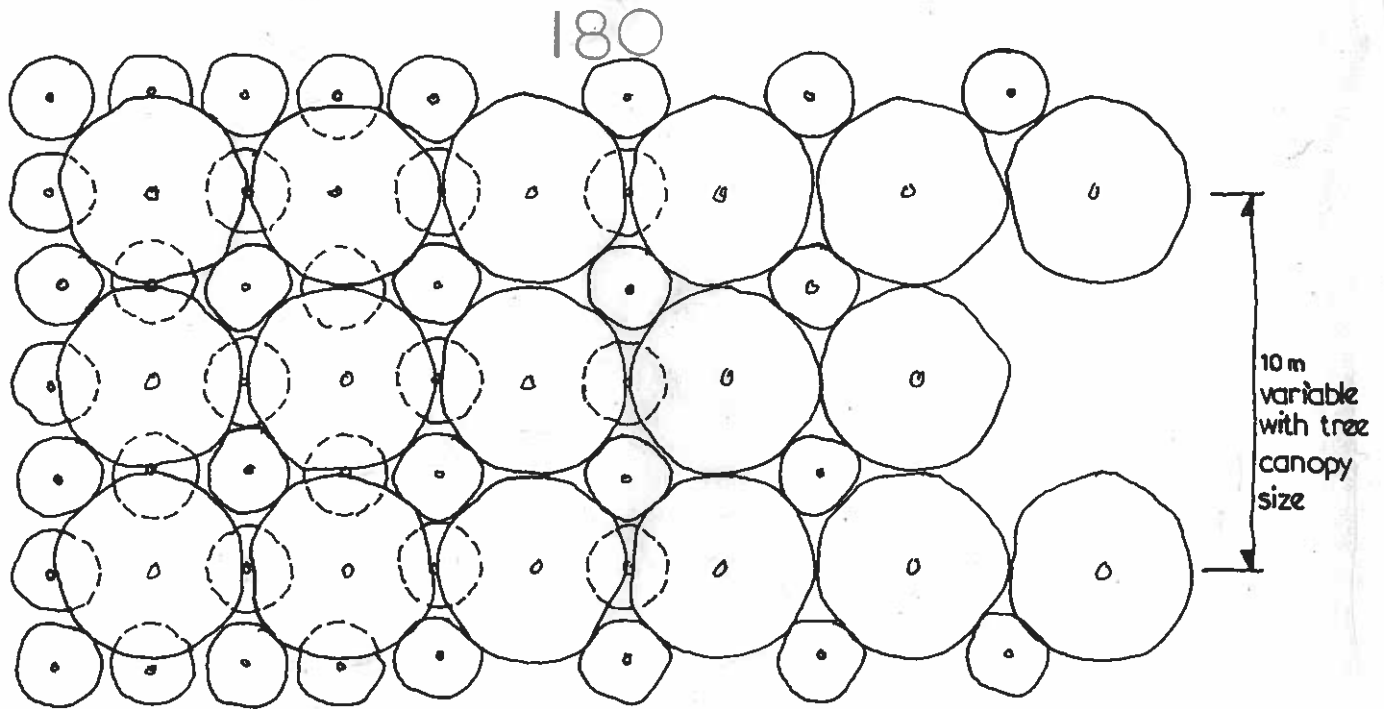
Forest By-Products: Seeds, nuts, flowers, balata latex and palm kernels may be collected in the rain forest without disturbing the forest canopy.

Fishing: Main types of fishing possible in the region include --

River fishing - The Coranthijn, Nickerie and Paris Jacob rivers provide primary fishing opportunities in small boats, using nets or rods.

Creek fishing provides opportunities for export aquarium fishing.

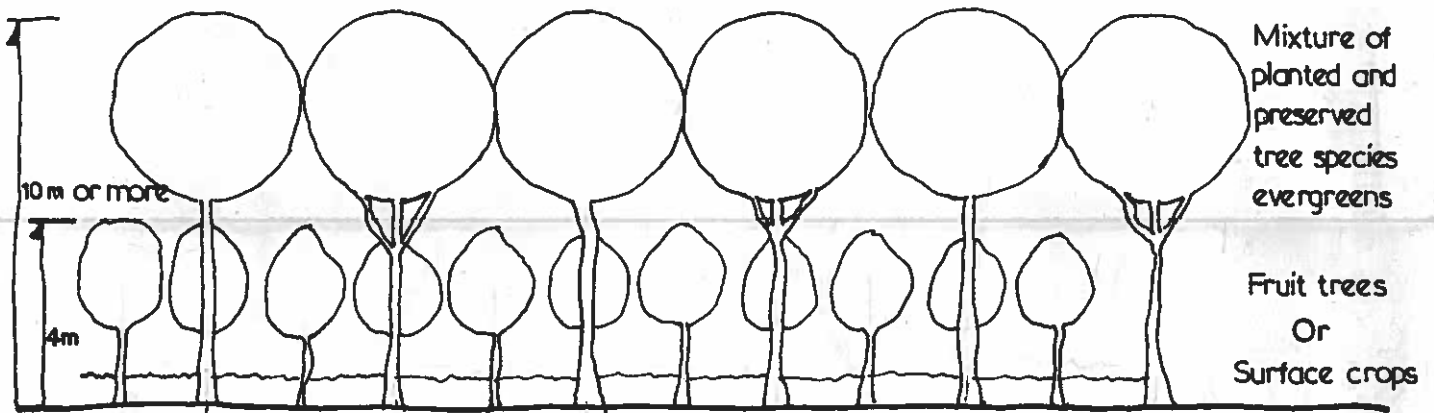
Swamp fishing is possible in the vicinity of Wakai during the dry season.



Concentrated grid
max. even shade

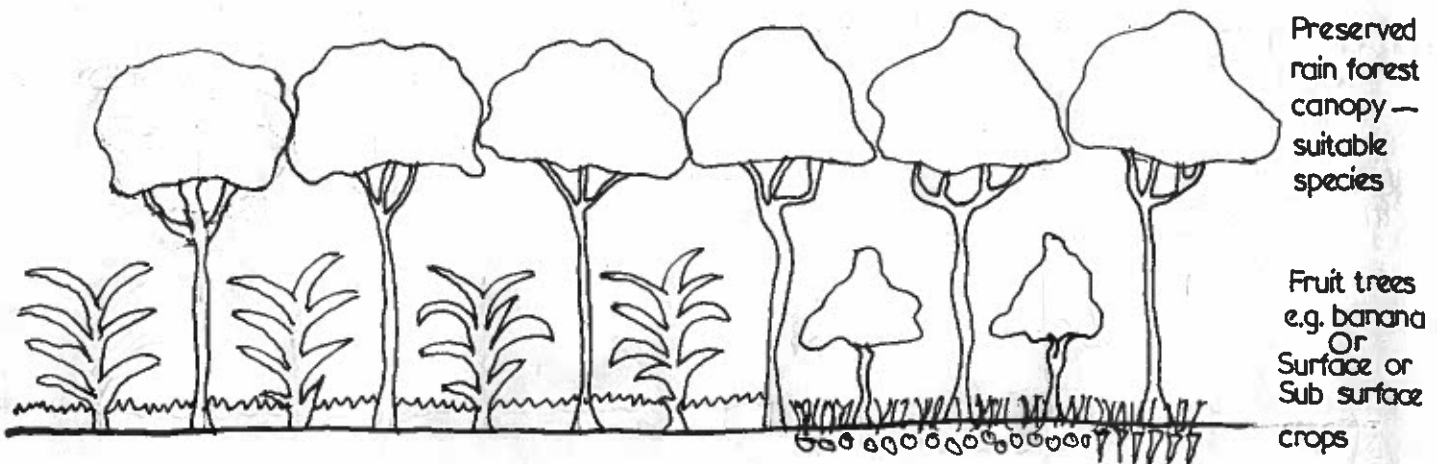
Row/strip
even shade

Open grid
pocket shade



1. AGRI - FORESTRY

Source: TNO Forestry Discussion 1979, Appendix Report



2. AGRICULTURE UNDER A PRESERVED FOREST CANOPY

Source: Goodland and Irwin 1975

PHASE 6

Comment - Uncertainties/Assumptions

As with all other phases, decision making in the process of selecting a regional development model is haunted by uncertainties and assumptions at times so diaphanous that they are difficult to identify. Policy values established in Phase 2 may be a certainty to the one holding such values as being essential to regional development, but they are not necessarily shared by everyone. For example the local Indian inhabitants may have as main policy value strengthening their social structure by retaining their land and life style, whereas the government's main policy value may be (and is) the striving for an as rapid economic development as possible, a value which by definition neglects social development/policy values of local inhabitants.

Wherever decisions have been taken with the policy values as one of the main testing criteria (as in the selecting of an optimal strategy combination) an assumption on the part of the decision maker is in evidence. He assumes that those to be affected by his decision share his point of view/policy values for regional development. It is here where planning has been said to be a political activity - action based on political conviction or bias.

Therefore, although decision making seems at times to be 'untouchable and incorrigible' when presented in a tooled up, technological way, it should be remembered that this is not the intention of present decision making. On the contrary, it is hoped that by presenting the decision making process simply and clearly, participation in the process becomes possible and probable, and this participation provides valuable input to re-structuring and re-thinking of the decisions taken.

6.0 The Regional Specific AnalysisResumé

The development model selected in the previous phase is to be located in specific regional space i.e. the region West-Suriname, using a regional specific analysis. A regional specific analysis entails the location of productive potentials as well as areas which are suitable/unsuitable for settling in the region. To this end the Potential Surface and Threshold Analyses completed by the ISP West-Suriname (1978) are used. However, as doubts arose regarding the outcome of these analyses, especially with regard to zones adjacent to the railway between Priority Area 1 and 2 (see map on the following page) three Plan Studies were consecutively undertaken for this zone to verify/falsify the ISP's findings. The eventual conclusion derived from these Plan Studies, served to verify and underline that of the ISP, as it could now be stated with greater certainty that this railway zone is indeed unsuitable for activity/settlement.

The development model was finally located within the two Priority Areas, in accordance with location criteria firmed up/refined in the work process.

6.1 The Potential Surface Analysis

Results of the P.S.A. are indicated on the following map. A number of factors of importance in determining whether a location (10x10 km sq.) is suitable of unsuitable for settlement were taken into account.

<u>Economic factors</u>	<u>Allocated priority weight</u>
1) Presence of minerals for mining purposes	10
2) Suitability for agriculture, forestry, live stock	5
3) Suitability for recreation or tourism	4
<u>Physical factors</u>	
4) Suitability of soil structure for settlement (bearing capacity, drainage, undulations)	3
5) Water	2
6) Climate	1
7) Transport	1

Two main priority areas emerged which had relatively the best weighting (Priority area 1) and 2)) and these two areas became the subject of further more detailed threshold analysis.

Priority given to mining is disproportionately large, but a sensitivity analysis was applied in which agriculture and mining were allocated equal weights. The findings did not differ greatly, with the exception that the squares which have secondary priority increased in importance.

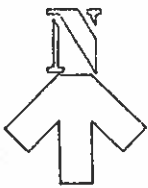
These secondary areas emerged primarily because of their agricultural potential, but were excluded from more detailed analysis for reasons given at length in the ISP, West-Suriname Report, (1978).

WEST-SURINAMIE

ATLANTISCHE OCEAAN

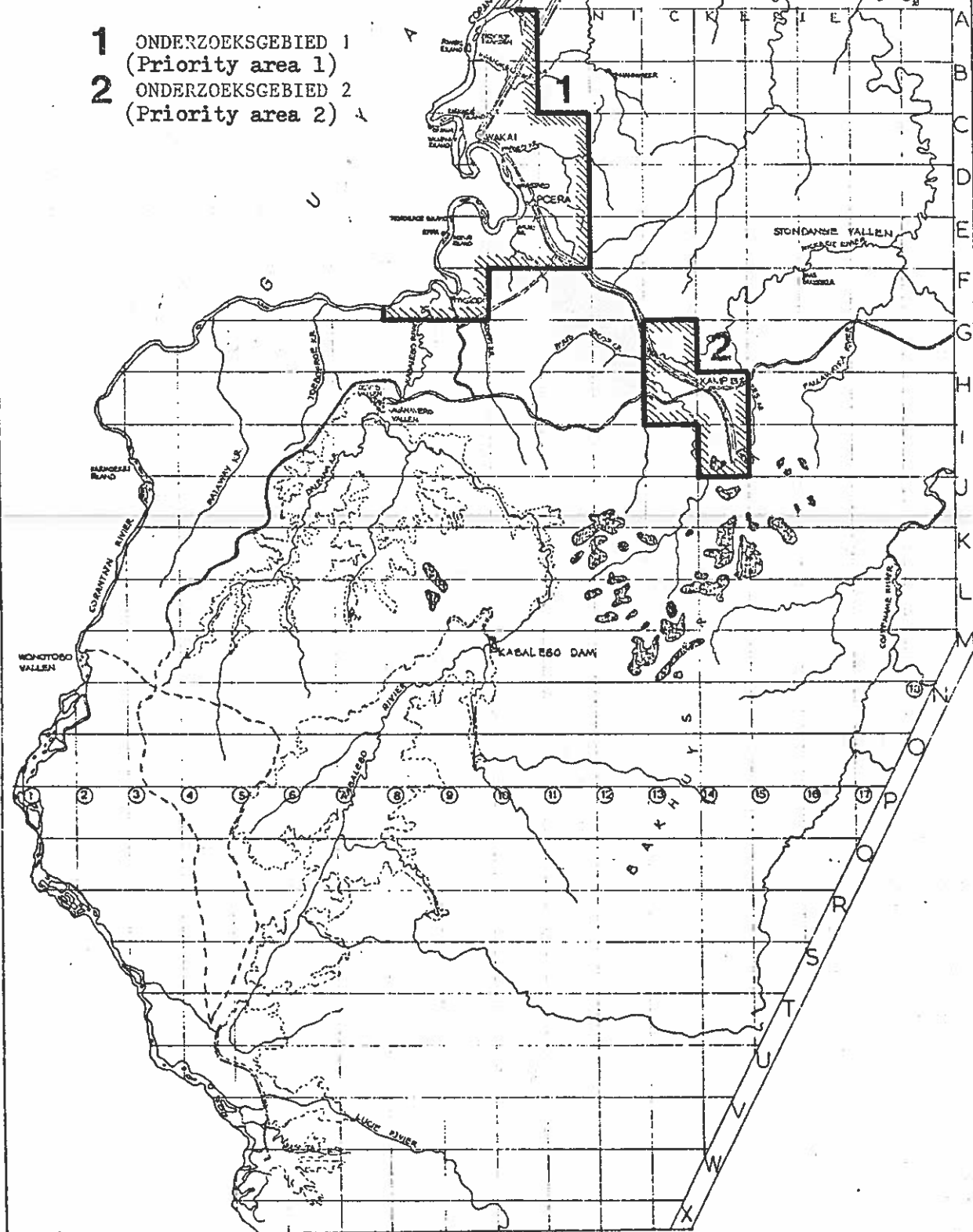
SCHAAL 1:500 000

RASTER 10-10km



Source: ISP West-Suriname, (1978).

- 1 ONDERZOEKSGBIED 1
(Priority area 1)
- 2 ONDERZOEKSGBIED 2
(Priority area 2)



6.2 The Threshold Analysis

An adapted form of Threshold Analysis was applied to Priority Area 1) and Priority Area 2) demarcated/identified by the Potential Surface Analysis. Findings of the Threshold Analysis for the two priority areas are indicated on the two maps which follow.

Factors which were considered in the mapping of threshold lines included:

- the degree of slope/undulation of the terrain
- natural run-off and soil drainage
- bearing capacity of soil for foundations
- workability of the soil
- future water supply and waste removal points.

Three extremely suitable areas for settlement were identified in Priority Area 1), as indicated on the map. One of them turned out to be exactly at Apoera, the other two up-stream and downstream from Apoera.

Because of the undulating terrain in Priority Area 2) only a small area in the upper-left is comparatively most favourable for settlement; Camp 52 and the Bakhuis mine being situated in undulating terrain at present. The crossing of the railway and the Nickerie river has been previously identified as extremely suitable for settlement by the ISP West-Suriname.

Reasons for the suitability of this location include:

- it lies at the junction of two different soil types - the sandy soils which are suitable for settlement and the granitoid weathered soils, which are highly suitable for agriculture.
- River estuary soil is more fertile relative to higher soils.
- The Nickerie river (40 m wide approx.) provides a large, constant water source, as well as recreation/fishing possibilities.

The above represents a summary of the findings of the Threshold Analysis as carried out by the I.S.P. West-Suriname (1978) in the process of arriving at their regional plan. The following two maps compiled by the I.S.P. West-Suriname indicate which areas in the P.S.A. Priority Areas 1) and 2) are most suitable for settlements.



TA Priority Area 1
Location for Settlements
Scale: 1:200 000
Grid : 1 km x 1 km



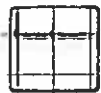
First priority



Second (slope)



Third (less drainage)



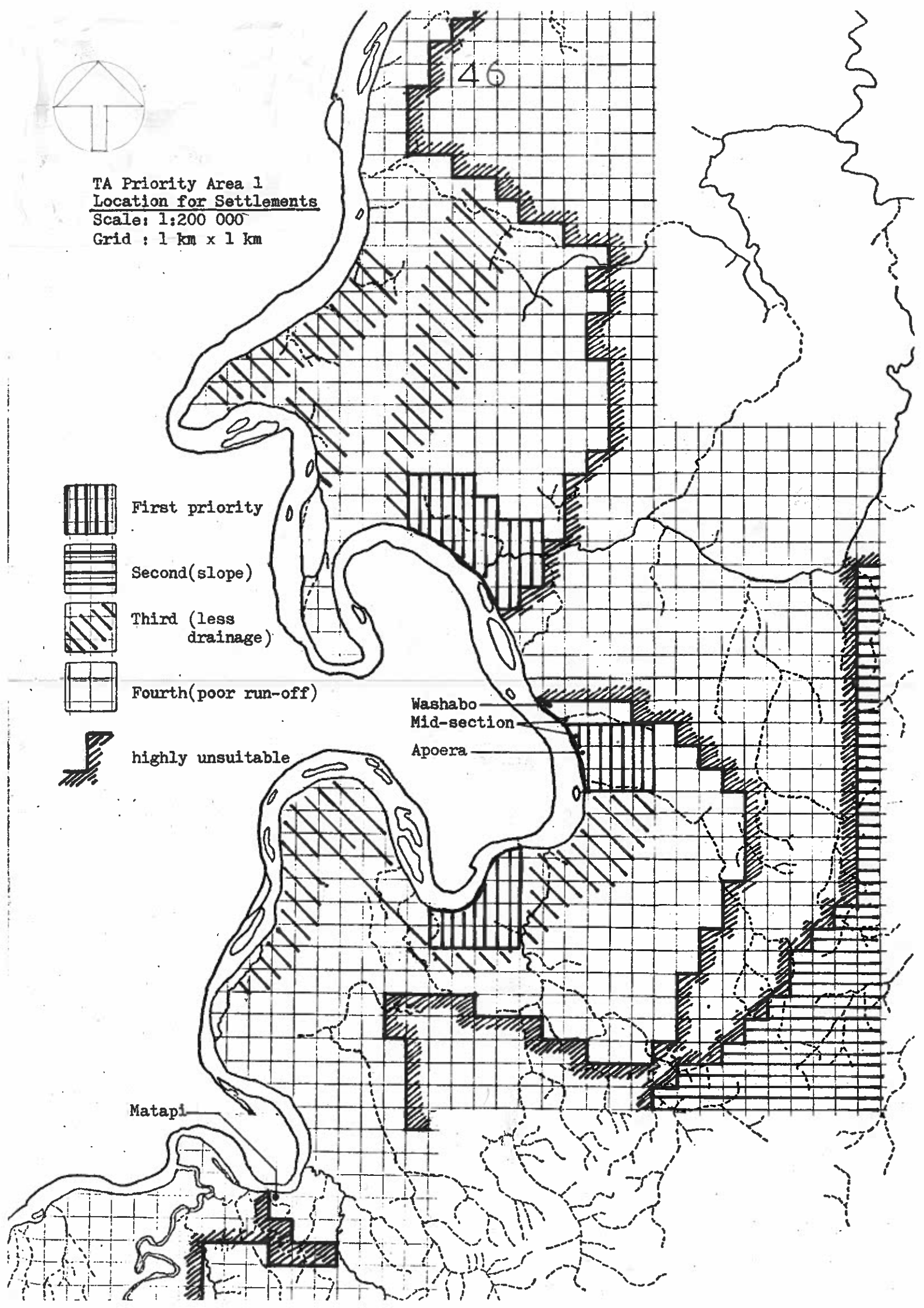
Fourth (poor run-off)

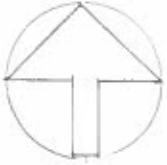


highly unsuitable

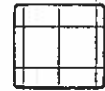
Washabo
Mid-section
Apoera

Matapi

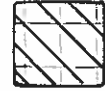




TA Priority Area 2
Threshold for soil and water
Scale: 1:200 000
Grid : 1 km x 1 km



First priority

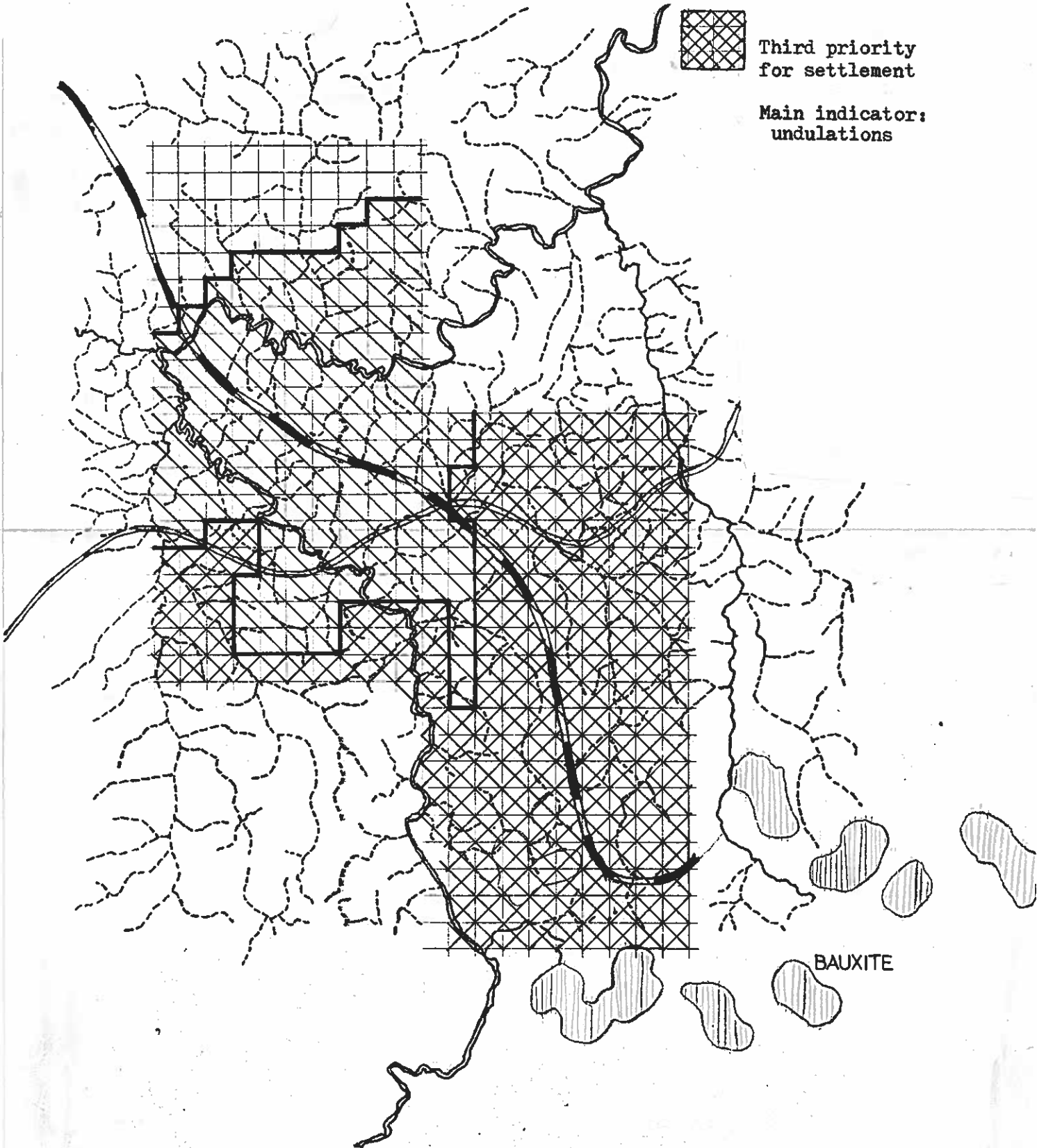


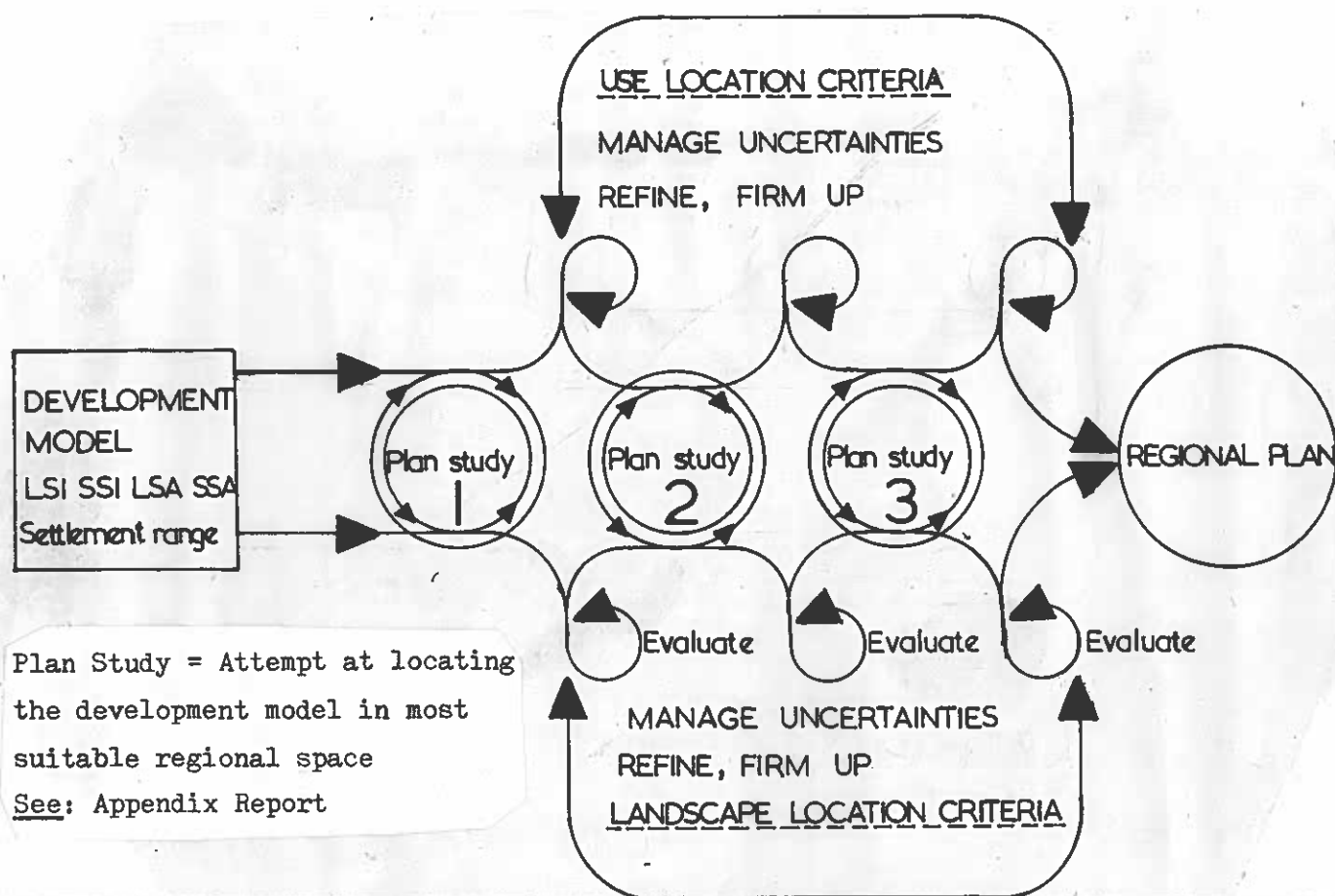
Second priority



Third priority
for settlement

Main indicator:
undulations



6.3 The Location of the Development ModelSub-work Phases in Locating the Development Model in Regional SpaceLocation Criteria

Two main location criteria categories were identified, both of which were further refined/operationalised subsequent to each completed plan study (see Appendix Report). The location criteria are used to determine as accurately and rationally as possible the optimal location of the development model. The following criteria categories were identified in the process of generating alternative plan studies:

Settlement Use Criteria

Such location criteria are specific to the specific types of settlement and their relationships, aspects which have already been analysed at length in Phase 4, especially sub-phase 4.6 - 'A Range of Settlements'. Most important factors include:

- Distances between settlements of specific hierarchical function and size. Distance and type of infrastructure determine travelling times between settlements. See phase 4.4, page 113, 114 and 116.

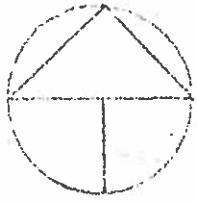
- (Social) service package per settlement type and size. Having (personally) analysed the size-services relationship in the ISP West-Suriname's work process, these findings are to be re-used, see page 164.
- Existing/proposed regional infrastructure and its capacity per mode.
- Physical barriers to new infrastructure, (natural e.g. rivers, hills and man-made e.g. canals, dams, surface mine excavation).
- Activity of each settlement type, e.g. export producing settlements should locate closest to the export off-set route and harbour. Farming villages should locate on best farming soil (erosion free, fertile, ample water), services centres should locate centrally and as close as possible to the villages they serve.

Regional Landscape Location Criteria

These location criteria pertain to (changing) characteristics of the regional landscape. As with the use criteria, the landscape criteria were refined subsequent to each plan study, and as improved information became available. Landscape location criteria include:

- Pollution - All areas are subject to pollution, but some areas will have greater unfavourable impact when polluted e.g. pollution of streams which flow through large unspoiled hinterlands. See map page 151.
- Erosion - Areas with steeper slope, mountain tops/ridges (watersheds) and source areas (recessing erosion) are all subject to relatively increased erosion danger. In contrast flat, low-lying lands, and down stream river banks are less subject to erosion danger, see maps on page 151,152,158,159.
- Type of soil - Relative fertility of the soil type, its workability (hard, soft, muddy, dry) presence of minerals/ores, sandy/clay. See map page 150.
- Type of vegetation - Swampy forest, inland dry forest, savanna vegetation. Goodland & Irwin (1975) suggest that the savanna areas in a rain forest should be exploited first as the more precious pure rain forest can then be preserved for a longer period, see map page 153.
- Natural barriers - Large rivers, mountains, undulating terrain and dense vegetation all form barriers to accessibility which should be evaluated when many interlinked settlements are envisaged, see maps page 158 and 159.

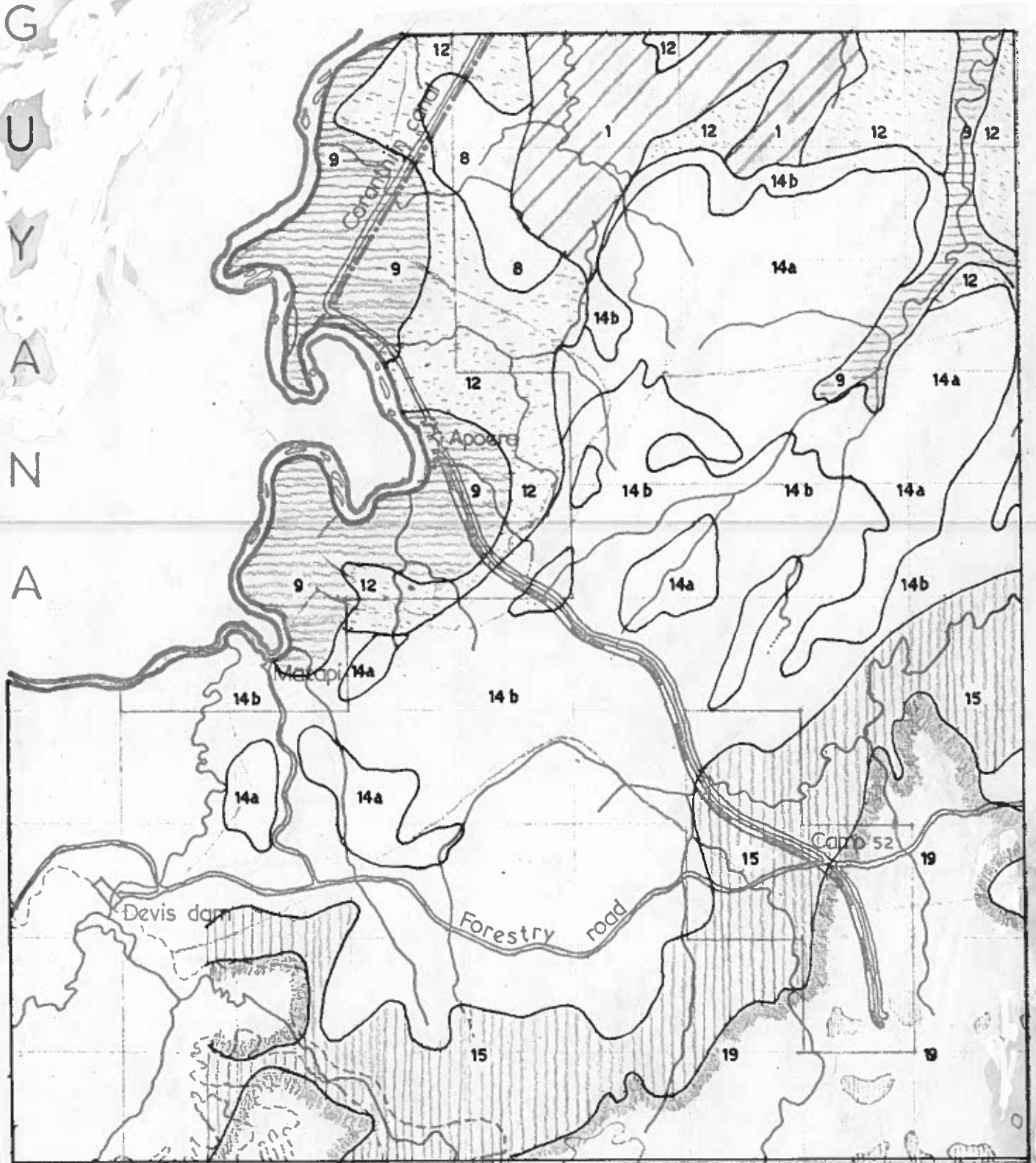
150 WEST SURINAME



SOIL TYPES

1. Peat,unsuitable for settlement and agriculture
8. Eustatic peat,unsuitable
9. River estuary sediments-suitable for settlement/agriculture
12. Para-sediments-unsuitable
- 14a Sandy soils-suitable firstly for settlement
- 14b
15. Granitoid weathered soils-suitable for agriculture
19. Metamorph complex soils-unsuitable for settlement/agriculture

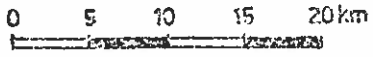
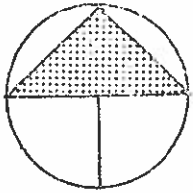
0 5 10 15 20 km



Source: MIAOP 1977

WEST SURINAME

UNSUITABLE SETTLEMENT/ACTIVITY AREAS



—•— Main Regional Watersheds



Sensitive Source/Catchment Areas (Not to scale)

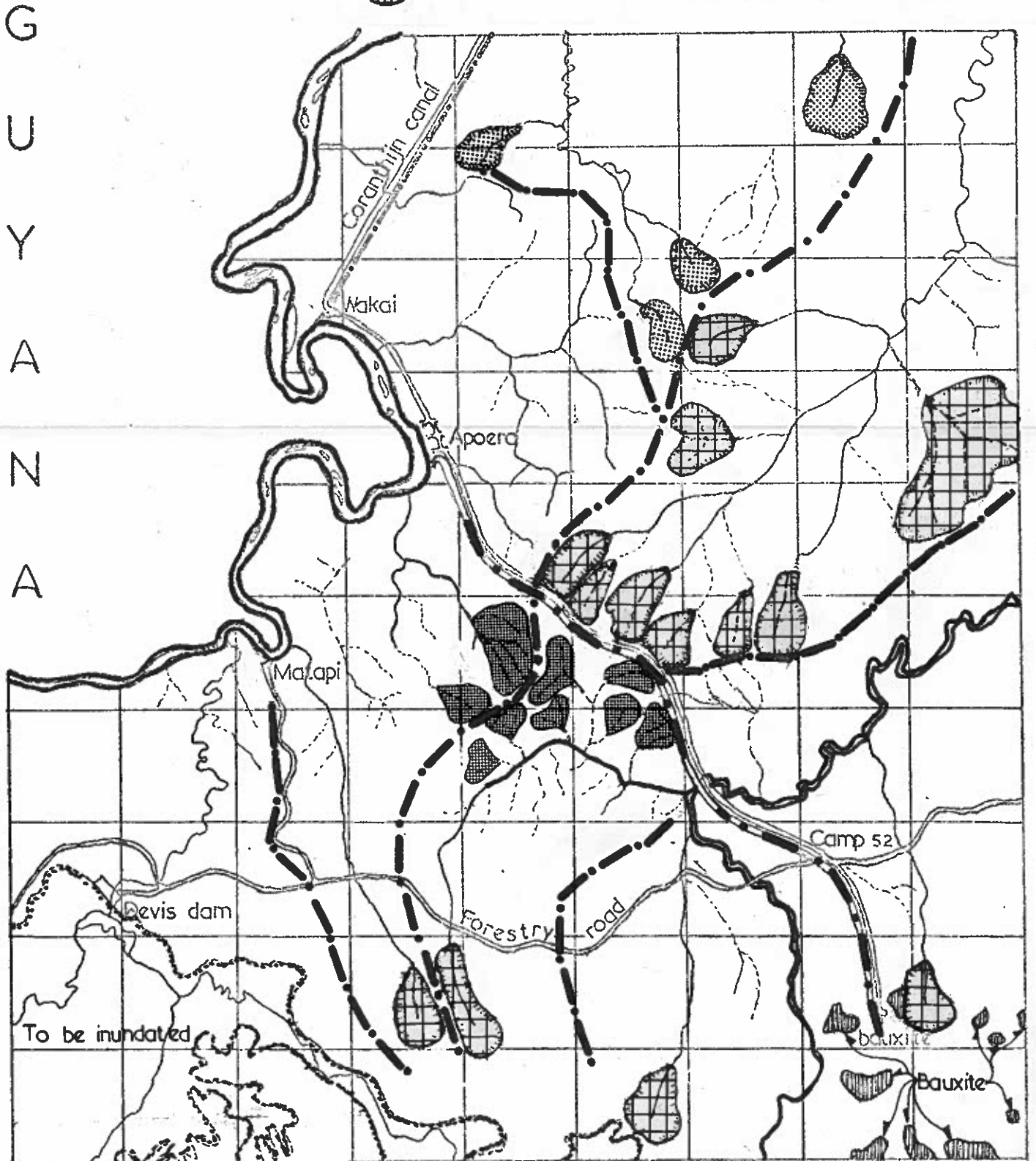
Pollution of extensive hinterland and erosion danger

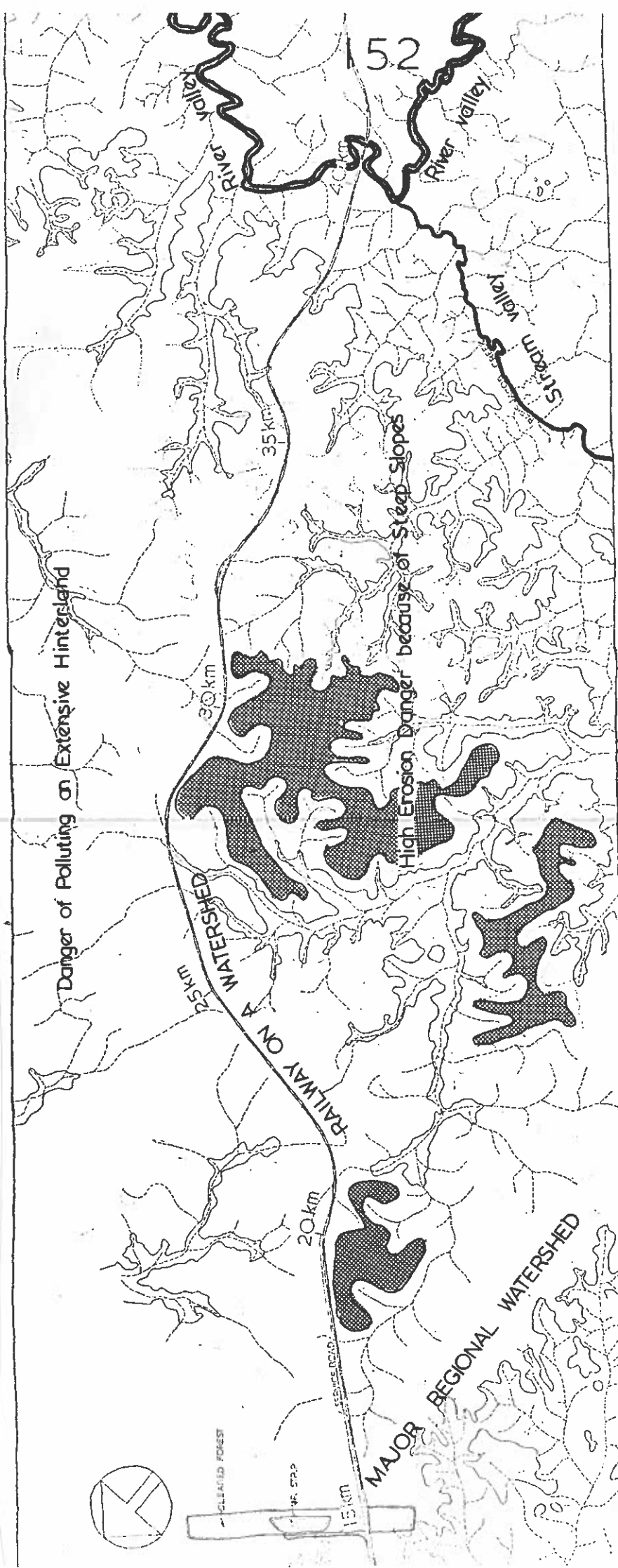


High Erosion Danger because of Steeper Slopes



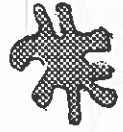
Pollution as well as Erosion Danger





RAILWAY ZONE

SOURCE AREAS AND STREAMS



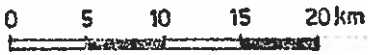
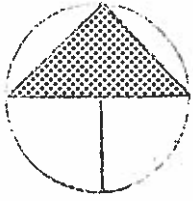
Smaller in-between pockets have a great surface length, and they locate centrally to sources of streams; therefore even they are unsuitable for settlement/activity of any kind.

WEST SURINAME

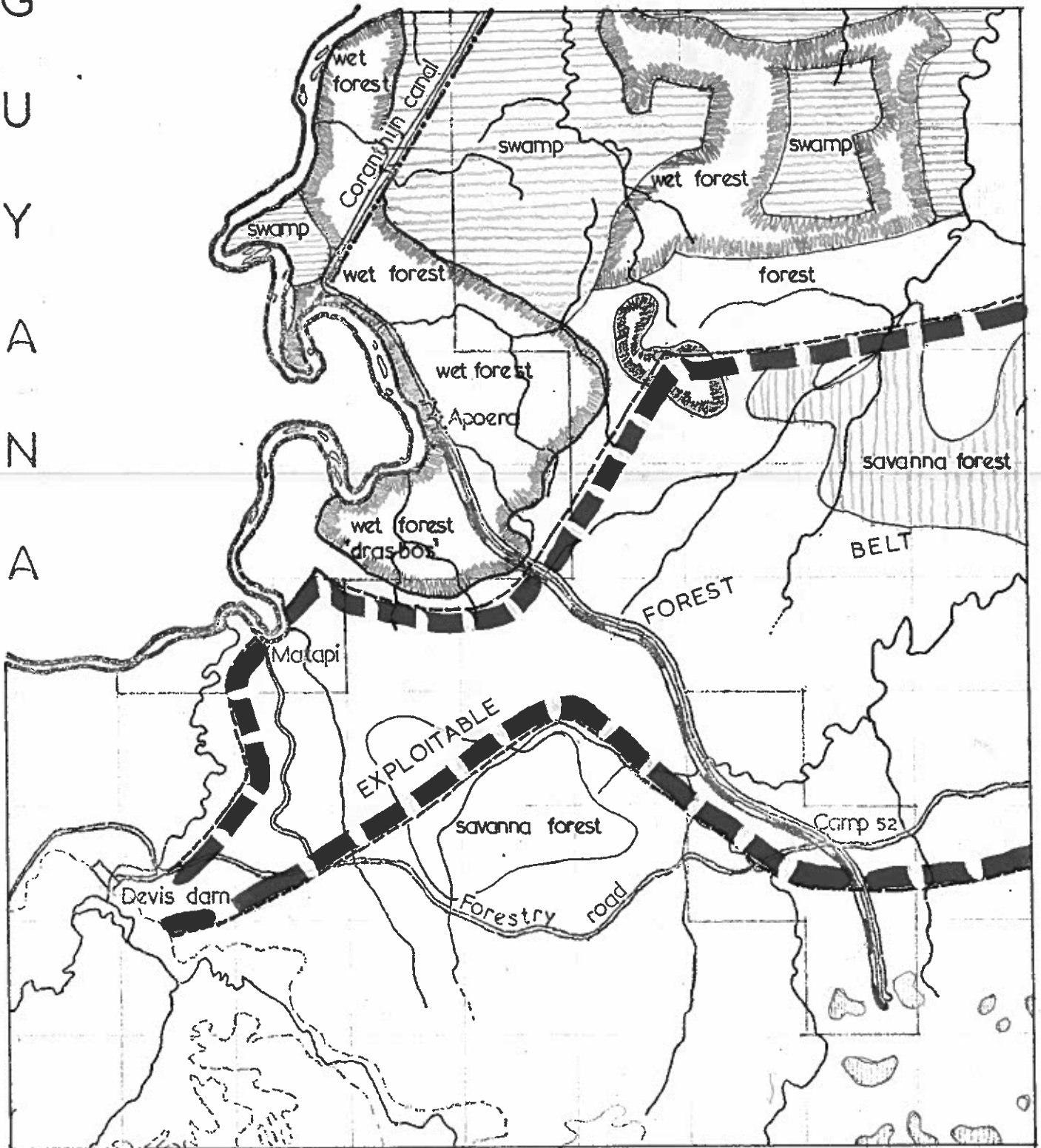
VEGETATION

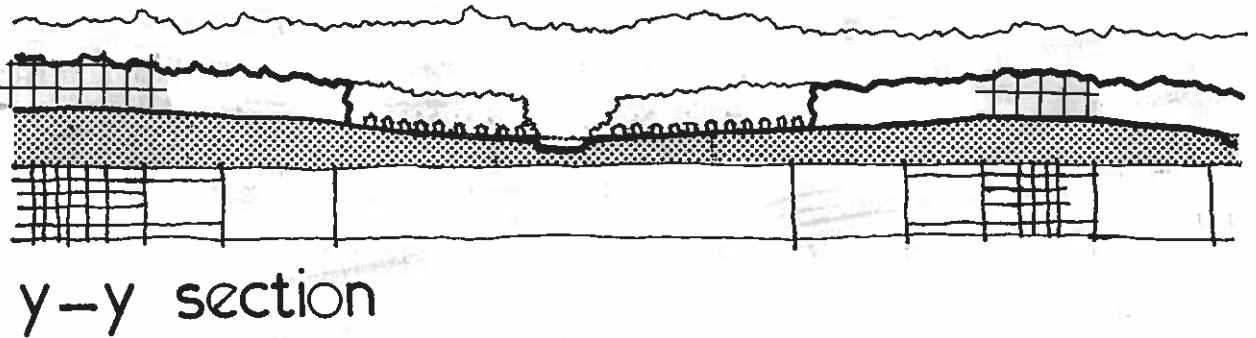
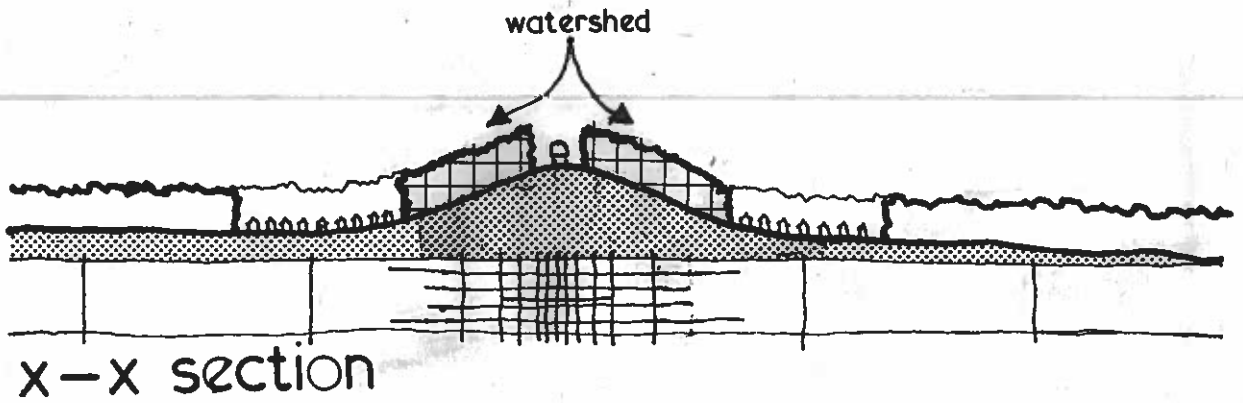
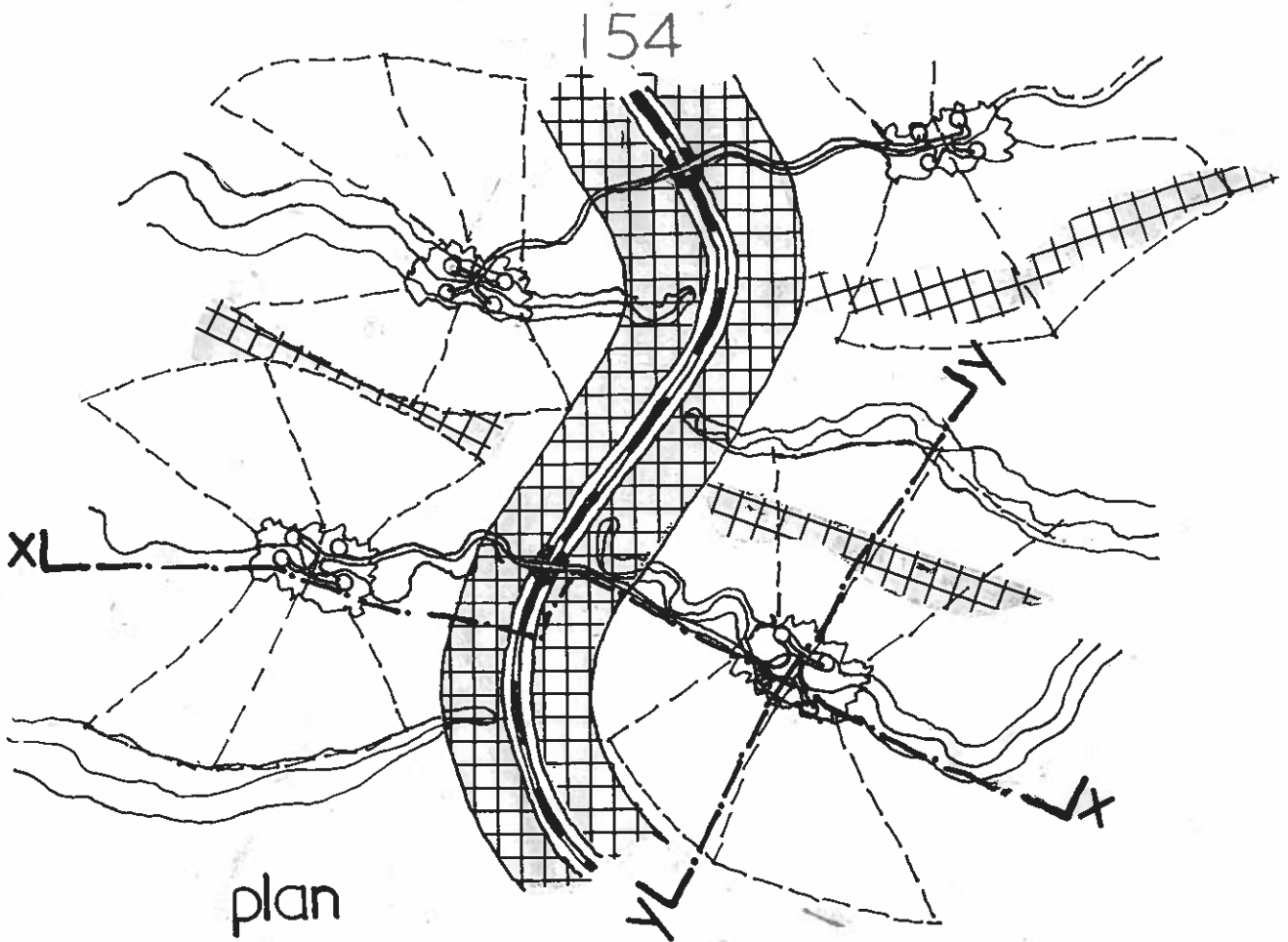
EXPLOITABLE FOREST BELT

SOURCE: Grote Bosatlas 1976



G
U
Y
A
N
A





INTENSITIES physical concept

≡ erosion danger/affect stream source

||| soil infertility

≡ preserve priority: watersheds & rain forest; source areas of streams

Settlement Location

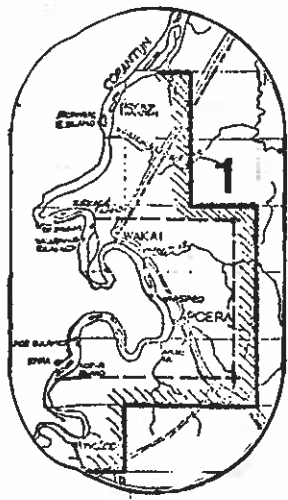
An analysis of the two priority areas indicates possible locations for future settlements. These locations are translated into the concept of a range of settlements, a settlement of specific size/function being located in such a way that it may best fulfill its function in the settlement hierarchical range:

- a rural services centre needs to be central to the 4-8 rural villages it is to serve on the one hand, but it should have good infrastructural/transport links with other rural services centres/towns to enable efficient transport of goods on the other. A town should be central to 3-4 rural services centres, but should also be located such that it can offer an efficient service to its rural services centres -travelling times are important.
- another important locational factor is the service rayon pertaining to various settlements. Should one settlement be located within the service rayon of another settlement, the former settlement will not be able to function independently, in time it will tend to become a kind of suburb (or parasite) on the other settlement, in which case it either becomes subject or object to the other settlement's functioning/influence, I.S.P. West-Suriname (1978).

Bearing the above two aspects in mind, a settlement location-possibility diagram (see following page) was set up to indicate comprehensive possibilities for settlement offered by the priority areas.

As may be seen from the diagram the rural services centre may locate at the railway with its service road, specific location being determined by the presence of the river. The terrain is excellent for settlement, the one drawback being slight undulations growing after the railway/Nickerie river crossing, in direction of the mine. Because of the undulating terrain a rural services centre there has been ruled out, whilst a village at this location (where Camp 52 is now) is likely. In total 4 rural services centres can locate in the Nickerie river zone, each services centre being 5 km from its neighbour on average. This distance allows for the possibility/flexibility that any one of the four rural services centres may become a future rural town serving the other three centres.

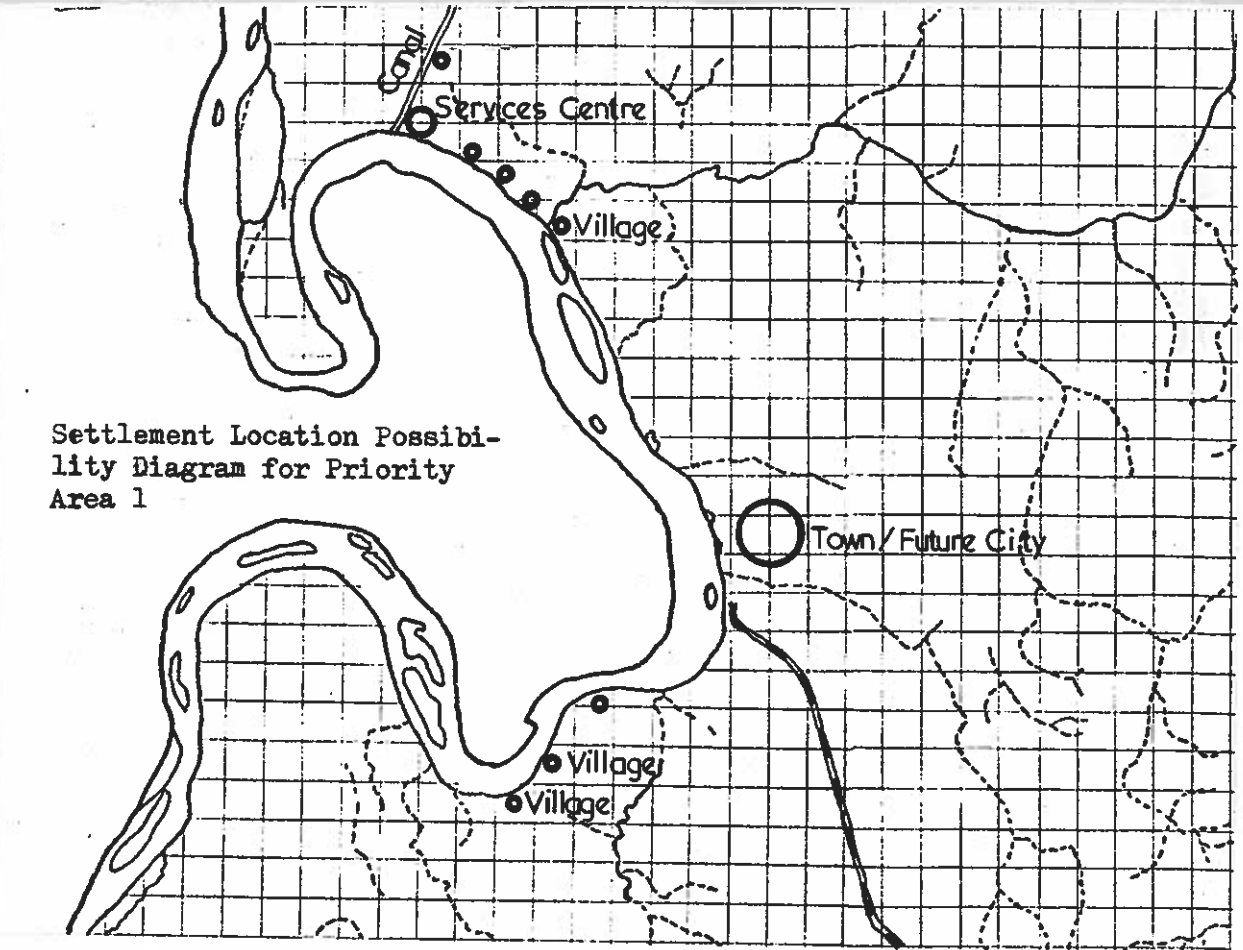
Further possibilities for settlement location were identified in the vicinity of the Corantijn river. To the south of Apoera a maximum of three village settlements are possible using Apoera as their services centre.

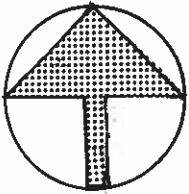
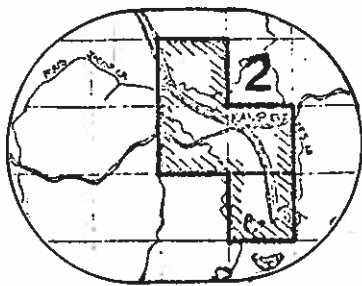


Most suitable settlement areas
in Priority Area 1
Source: ISP West-Suriname (1978)

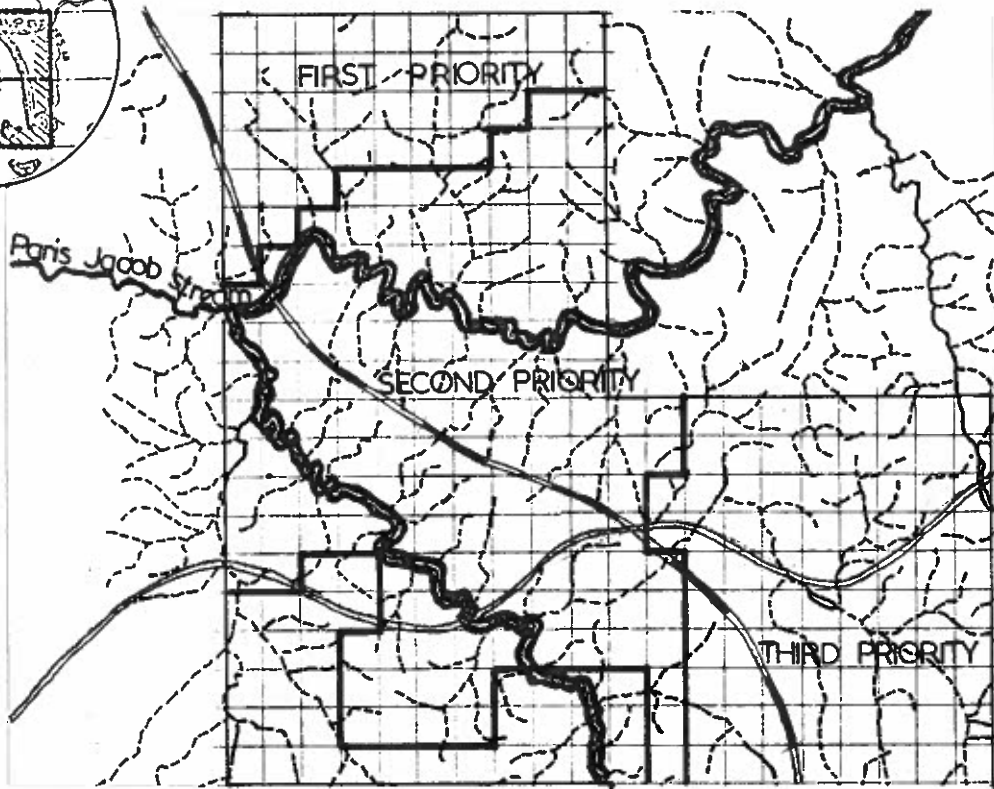


Grid 1x1 km



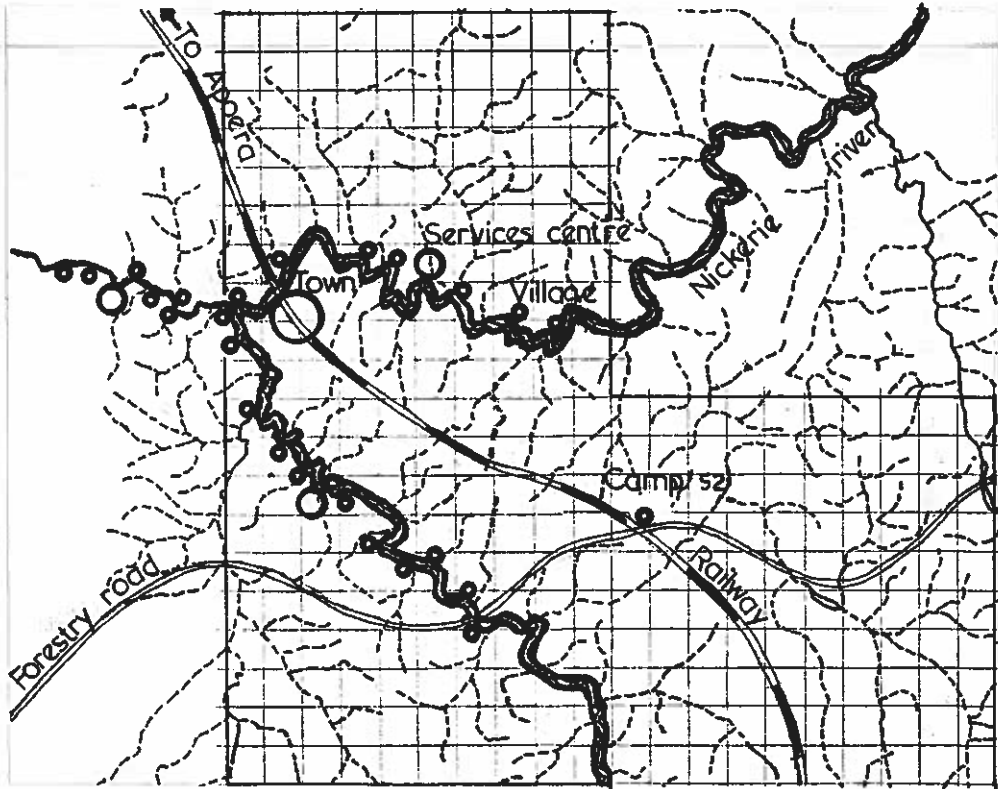


Grid 1 x 1km

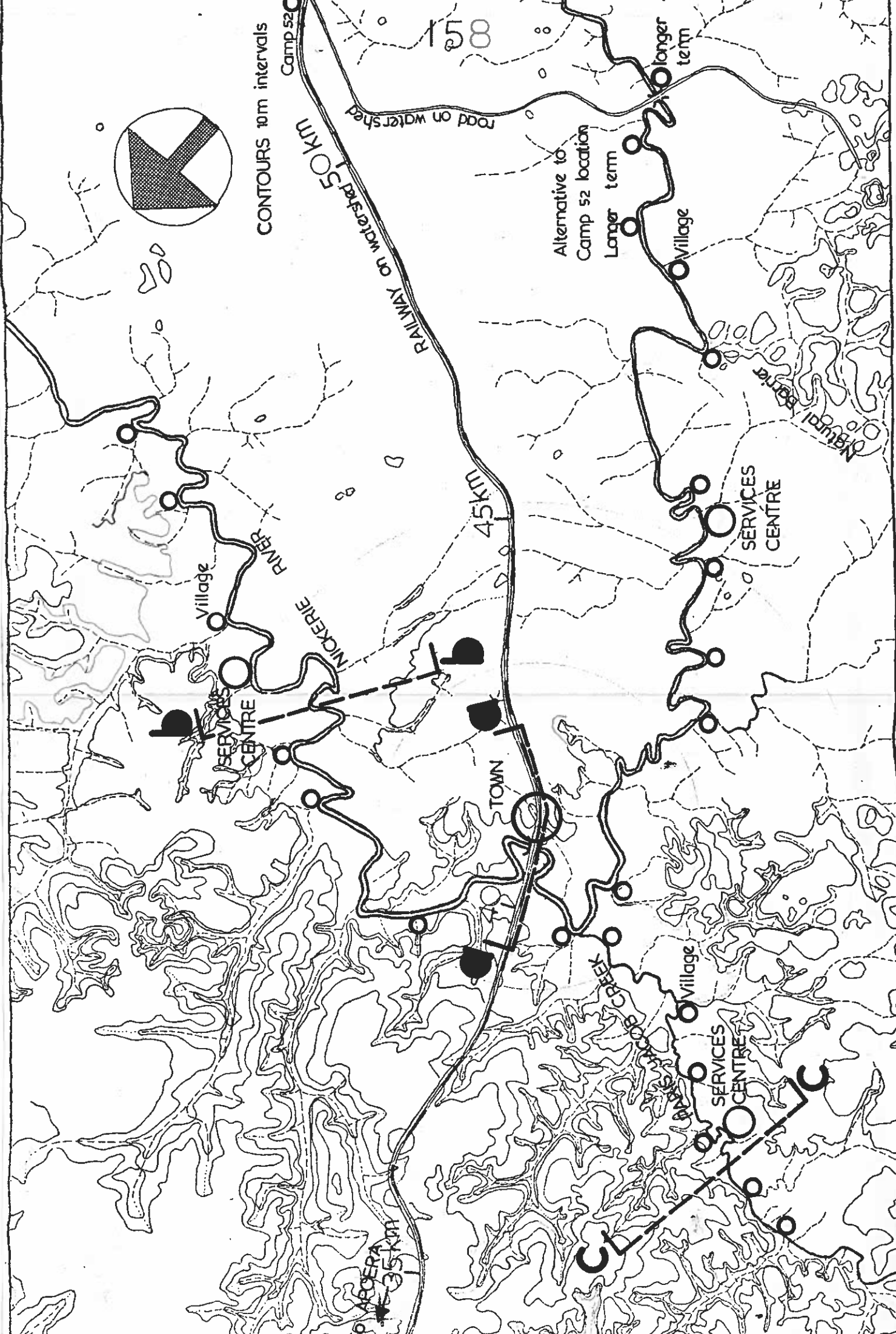


Most suitable settlement areas in Priority Area 2

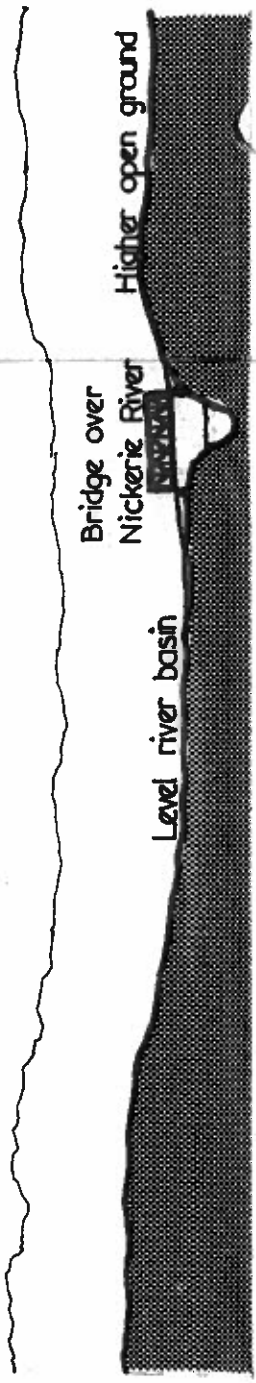
Source: ISP West-Suriname (1978)



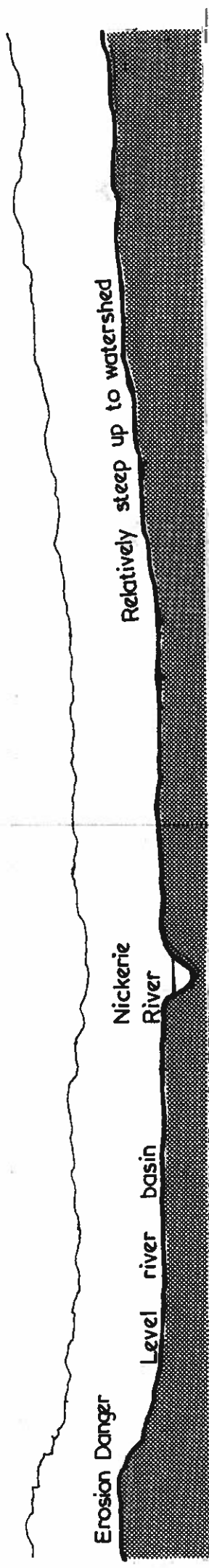
Settlement location possibility diagram for Priority Area 2.



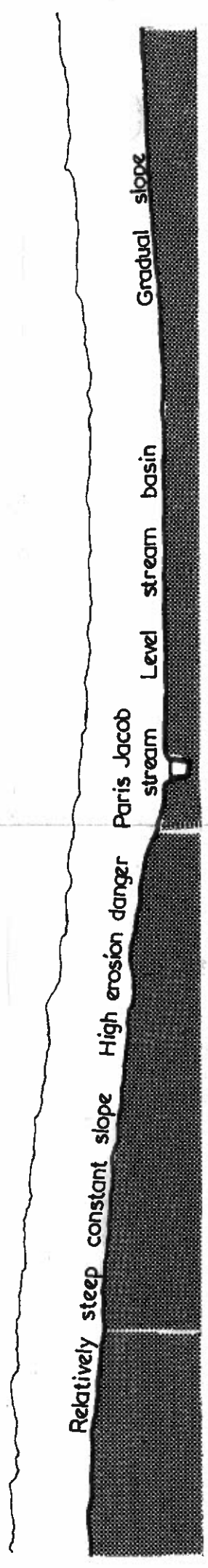
Detail of the settlement location possibility diagram for Priority Area 2



section a-a



section b-b



section c-c

Horizontal scale 1 / 40 000

Vertical scale 1 / 2 500

specific site sections

At Apoera itself only one rural services centre/town is possible because of the limited size of suitable settlement area in its direct vicinity. To the north of Apoera at Wakai a minimum of 4 village settlements are possible using Apoera as their services centre, alternatively one services centre serving four settlements could be established at Wakai. Apoera is selected as services centre/future town without much further consideration mainly because of the advanced stage of existing activity there - the first phase which includes two schools, approx. 100 houses, and an extensive road network, is practically completed. A 'second phase' is already being constructed.

6.4 In review, the total range and number of settlements offered by the comprehensive priority areas are as follows:

Settlement Type	Estimated Number	Location	Total min. no. of inhabitants
Village/Commune	10 (min.6 - max. 15)	Vicinity of Corantijn riv.	2 500
Rural services centre	1 max	Wakai	500
Town	1	Apoera	2 750
'Corantijn' Sub-total	112	As above	5 750
Village/Commune	15 (min.13 - max. 20)	Vicinity of Nickerie riv.	3 750
Camp 52	1	railway/forestry road crossing	500
Rural services centre	3	Nickerie riv.	1 500
Town	1	possibly at railway/Nickerie riv. crossing	1 000
Nickerie riv. sub-total	20	As above	6 750
Regional Total	32	As above	12 500

Note: Average population sizes used for the above tabel are as follows:

<u>Settlement type</u>	<u>Minimum no. of inhabitants</u>
Village/commune	250
Rural services centre	500
Rural town	1 000

A rural services centre is not much larger than a village/commune as it does not necessarily offer more employment and labour intensive activity, members of the village/commune may serve part-time functions in the services centre thereby decreasing the need for services centre employees.

Specific locations of the villages/communes is not possible at this stage, it being advisable to do extensive site investigations to fix best locations. This may be done by experts but choices between locations of similar suitability should be left to representatives of the future village/commune.

Comment

6.5

Flexibility: is possible in the phasing of the range of settlements; in alternative centres of gravity for the future town; in the precise location of villages/communes; in the fact that Apoera needn't become a full-grown town but remain a services centre. The existing infrastructure (railway and its service road) makes much of the flexibility possible, and enables efficient transport to and from settlements. To this end bypass-zones must be constructed at the rural services centre/future town.

Feasibility: is promoted by a more intensive use of the extremely expensive railway line which otherwise is a total loss in the framework of existing plans.

Ecosystem Impact: is limited by the placing of larger urban settlements (rural services centre/town with its industries) at areas where rain forest has already been destroyed i.e. no new areas need be cleared for the new rural services centre (which becomes a future town) and the town at Apoera.

Note: Uncertainties which played a role in the determining of settlement location were systematically reduced by, amongst other means, the three plan studies taken up in the Appendix Report. As these did not eliminate all uncertainties (especially those requiring extensive further study) remaining uncertainties have been grouped and defined in Phase 7.7.

PHASE 7

7.0 The Regional Plan - A Proposed Development7.1 The Program in Outline

Large scale industry (bauxite mining/production) is to have a reduced effort/investment phasing priority within the region, its production being consciously slowed down to enable the regional base to establish itself and flourish.

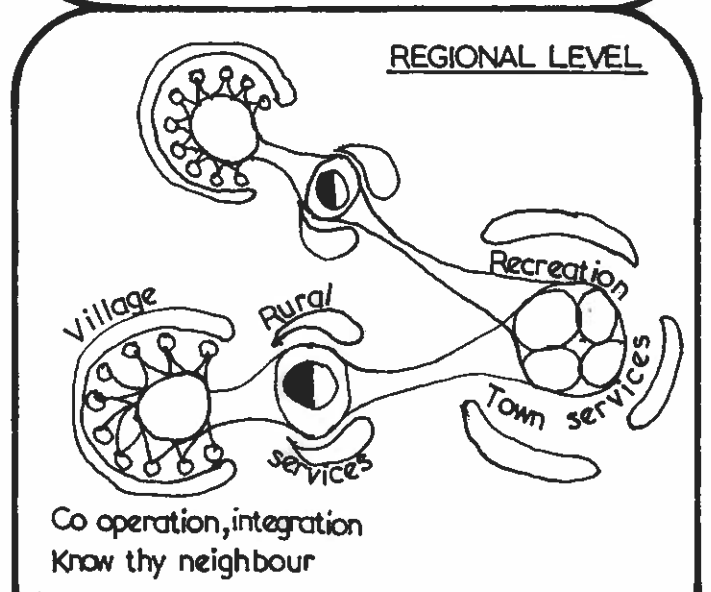
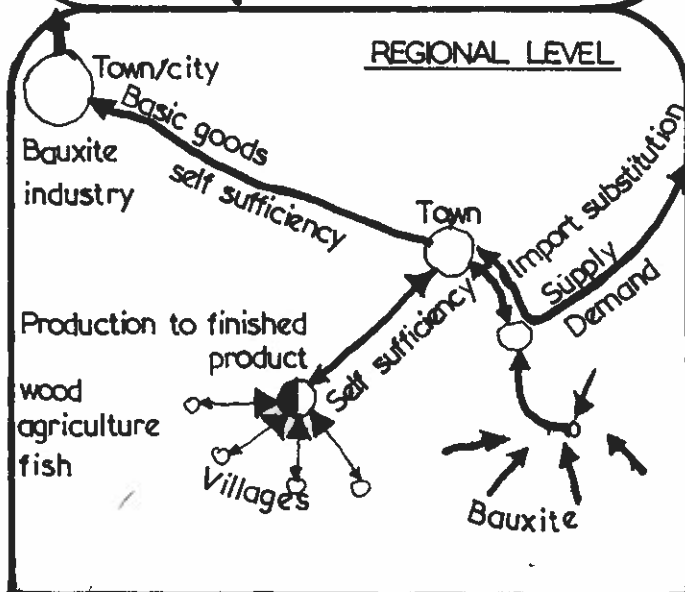
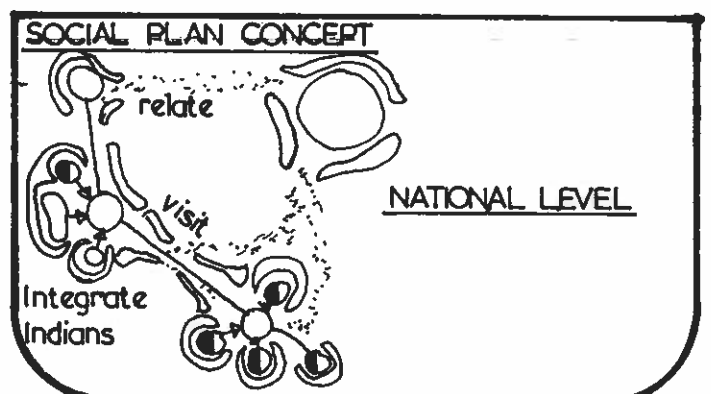
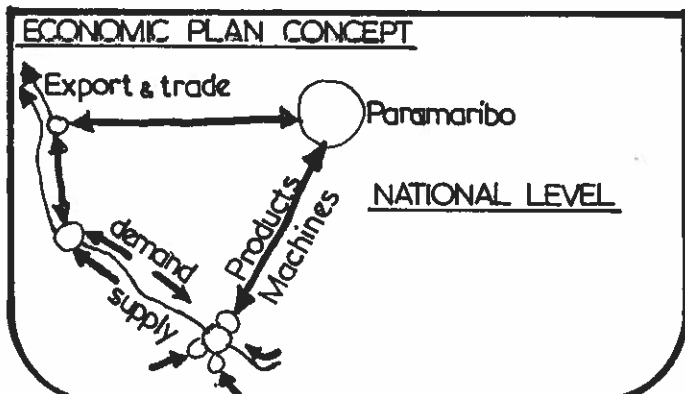
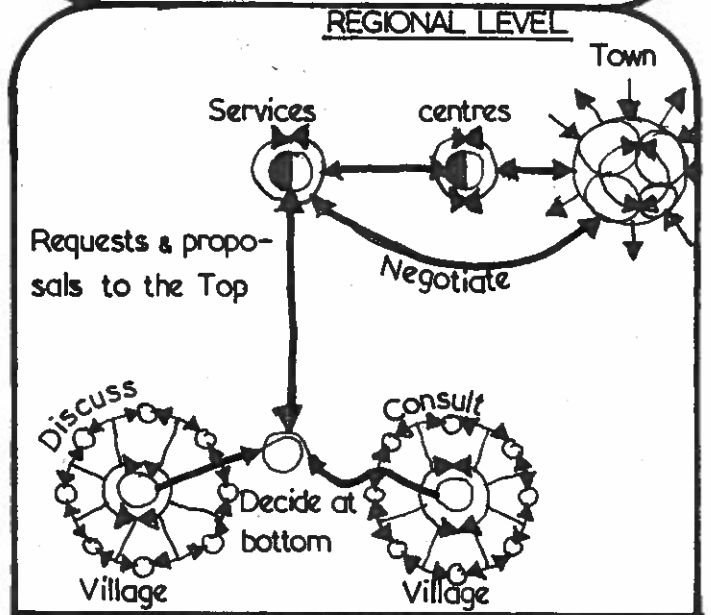
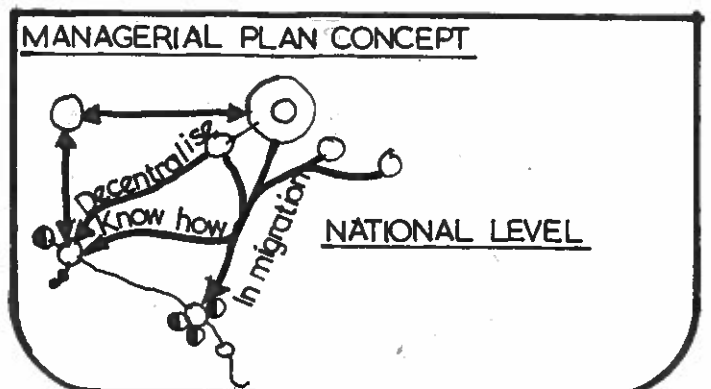
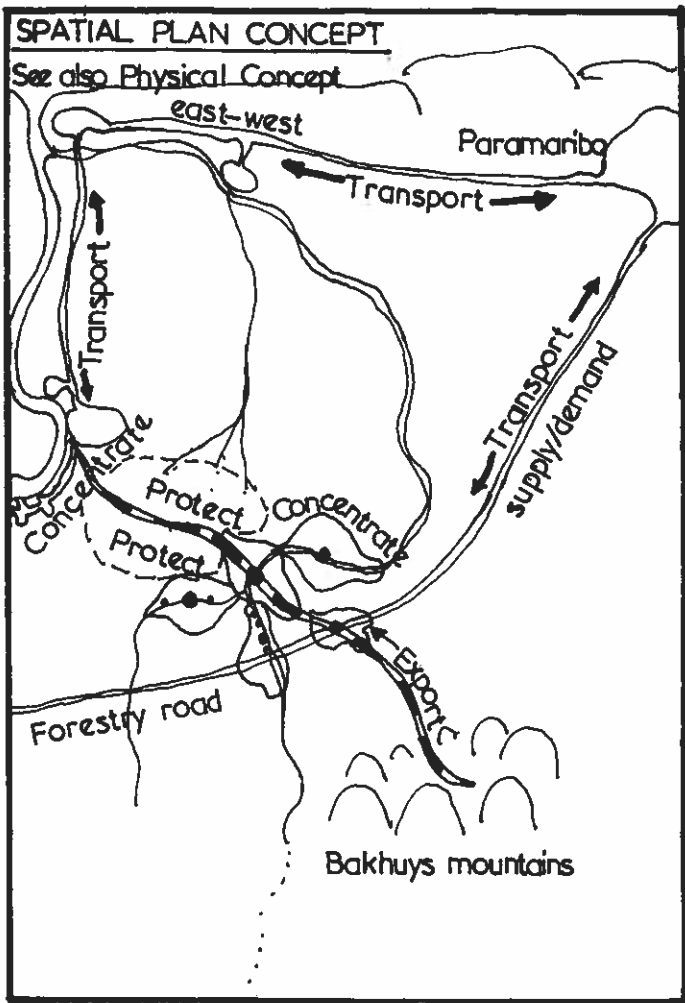
The regional basis includes small scale settlements set up and managed as co-operatives or communes in a village of 10-30 family farms averaging 5 ha each. A rural services centre is located centrally to a minimum of four and a maximum of eight villages, and is established immediately after four villages are inhabited. Its main function is a distribution centre of products, machines, know-how etc., and not as a production centre. A rural town is established on a relatively more favourable location than the rural services centres. Suggestions are made as to its most probable location, but these suggestions are open-ended to anticipate unforeseen regional development which could alter the centre of gravity within the settlement pattern. Areas which are unsuitable for a rural town with regard to the service/market function it offers to villagers and rural centres are indicated.

As bauxite mining/production is inevitable in the region, its presence has to be accepted, consequently the location of the regional town, (small city) at Apoera has also to be accepted mainly because of the advanced stage of implementation of the existing town plans for Apoera.

As with bauxite production, the construction of Apoera is recommended to have a reduced priority and a slower phasing than a present. Recommendations are made with regard to the land- rights of the Indians at Apoera, and their integration/participation in the regional/rural development.

The emphasis of the program is on aided self-help in the initial phases of implementation with the objective of achieving complete economic self-reliance and decentralised rural management in the middle and longer term. In this regard the rural services centre plays a strategic role as guiding stimulating and monitoring centre.

The main types of production envisaged in the program to enable the modernising of the rural areas include rice, tropical fruit (bananas, citrus, etc.) forestry to manufacture products for national/neighbouring use, oil palm for export of vegetable oils (long term) and livestock/fowl runs for regional consumption needs. Fishing and forest by-products form the two main short and medium term complementary village activities.



The presence of large numbers of semi-skilled and skilled mining employees earning substantial salaries provides a substantial market for rural produce. So too does New Nickerie, Paranam to the east and ultimately Paramaribo. Trade with Guyanese across the river is recommended in the program as a stimulus to stabilizing the rural supply/demand production market.

7.2 The Regional Spatial Pattern

As counterweight to the large scale ore-production activities planned for Apoera, it is proposed to establish 13-20 villages/communes in a 6 km (maximum) zone in the vicinity of the Nickerie river. Four rural services centres are to be established in this area at 5 km distances from one another, this distance enabling flexibility in the location of a future town in that its influence rayon does not affect neighbouring rural services centres. Because of difficult, undulating terrain, Camp 52 is not to become a service centre, but an independent centre, (company town) which utilizes existing houses there and is used mainly to house miners and their families working at the Bakhuys mine. The Camp 52 centre could make use of a service centre to the North-west of it along the railway/service road.

Apoera is to have a reduced spatial size (not 30 000), is also being planned as rural services centre for 10 villages/communes to north and south of it in the vicinity of the Corantijn river. Apoera owes its size (approx. 2 800 inhabitants) to the fact that it is a harbour, large scale bauxite industrial complex, centre for large scale agriculture, long term services centre to the 10 villages.

Exact locations of villages in the 6 km Nickerie zone are to be determined by site analysis and ultimately the decision of the future commune or villagers. Minimum distances of one km and maximum distances of four km between villages should not be exceeded to enable easy contact by bicycle, small bus and even walking. A suitable average size of a village commune is thought to be 250 inhabitants.

One Village/Commune consists of:

(Source: I.S.P. West-Suriname; Surinamese Planning Service; Policy Paper on Health Care in Suriname 1976-1980)

30 family farms at 5 ha avrg. each = 150 ha or 1 x 1,5 km

2 forestry selective cutting/cultivation units of 15 men maximum each.

Agricultural co-op run by the farmers.

Communal storage/transport depot.

An emergency sick bay.

1 grocery store (all-purpose)

1 child play space

Total estimated village area = 1 ha (100 x 100 m)

The rural services centre (which serves 1 750 people including its own inhabitants) consists of (source as above, total served population being 2 000 on average):

2 daily-use shops (grocer, dairy)

2 all-purpose shops (hardware, dispensary, clothing, seeds)

1 restaurant and 1 petrol station (perhaps combined)

1 small post office, telephone exchange and 1 bank.

1 development-guidance centre (extension worker)

1 saw mill with 10 employees at every second services centre.

1 poli-clinic with a doctor and two nurses for every second services centre

1 multi-functional community centre (500 m²)

1 small harbour/jetty with loading platform and storage facilities

1 primary school with 5 classes and 1 nursery school with 3 classes

1 high school with 8 classes in every second rural services centre

churches per denomination as required

Total estimated services centre area = 2 ha

The rural town at Nickerie river which serves a rural population of 5 000 including its own town's folk of 750-1 000, consists of:

6 shops for daily use

3 clothing stores

6 all-purpose shops

1 restaurant and 1 petrol station (perhaps combined)

1 town market (1 large one at Apoera)

1 small post office, 1 telephone exchange and 2 banks.

5 livestock, dairy and/or crop farms =, 50 ha

1 police station with 3 policemen

1 fire station with 2 firemen

5 carpentry workshops.

1 poli clinic with 1 doctor, 3 nurses, maternity ward and ambulance

1 dentist

a library

a 700 m² community centre

a theatre/cinema

one creche and a nursery school with 3 classes

one primary school with 6 classes

one high school with 4 classes, 2 football fields and a small swimming pool.

1 technical school for the acquiring of agricultural and hand craft skills in the district.

Total area town = 3 ha

As the population size of Apoera is estimated as ultimately being 2 750 - 3 000, the figures in the above list for the railway rural town may be tripled (not in all cases!) to arrive at appropriate figures for Apoera.

Total area of Apoera = 6 ha

Regional Transport Routes

The road network being constructed in the region at present is adequate for supply to and delivery between rural services centres and two towns. The forestry road provides a 250 km link to Paramaribo (from Camp 52) and the railway and Corantijn Canal service roads an 80 km link to New Nickerie (from Apoera). Needless to say the latter connection to New Nickerie, also possible by 5 000 ton boat on the Corantijn river, will become the most important and frequently used of the two roads, as it cuts the distance to a sea harbour/populated centre by 65%.

Roads between services and villages, as well as villages and villages, are to follow natural contours and be hardened top-layer, asphalt roads being too expensive in the initial development phases.

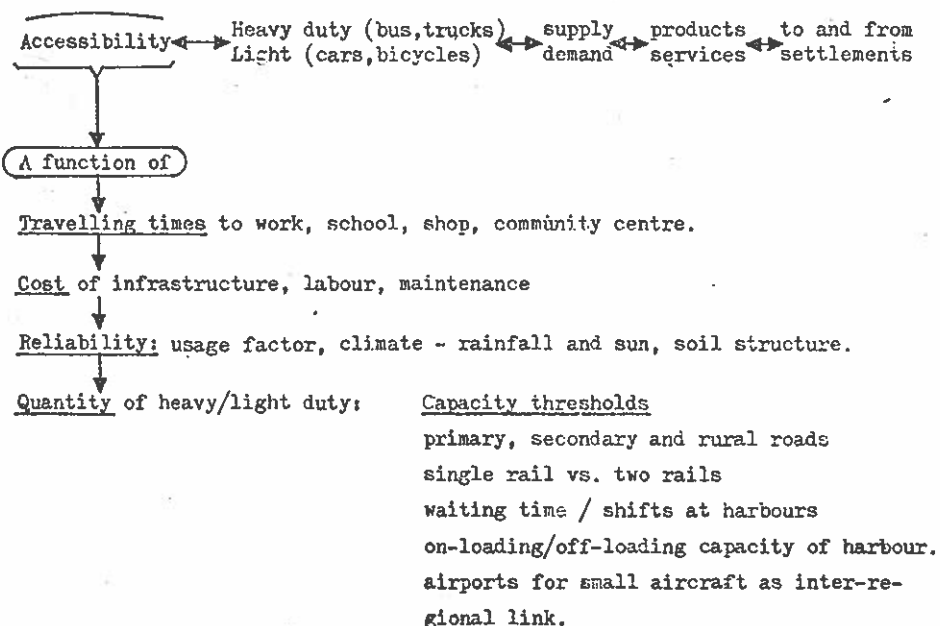
Forestry Road: At present the road most used for transport between Paramaribo and West-Suriname is the laterite surfaced forestry road of 7-8 m wide. Ditches and grooves occur in its surface from time to time and its efficient use (100 km/hr speed) is possible only with frequent maintenance (scraping the surface to level it). Laterite is sprinkled on the road to harden it, but dust clouds are still a problem. The road is the possession of the Surinamese Forestry Department as it was initially made for forestry purposes. It is the intention that the future main road connection to West-Suriname be the asphalted East-West at the coast linked to Apoera by a road next to the Coranthijn canal, the forestry road being used solely for forestry purposes.

The railway and its Service Road A strip has been cleared in the forest of approximately 150 m on either side of the railway line - this to prevent falling trees from obstructing either rail or service road. The service road is 6 m wide and is also surfaced with laterite. At Camp 52 the road narrows to 4 m as it is still under construction there. At 6 m width two small trucks can pass one another at speed - small undulations in the road require maintenance at specific intervals, which depends on the amount of traffic and rain fall.

The railway, with its single track, and four bypass zones, has to cater for uni-directional transport only (mine to Apoera) in the framework of the existing plans. The rolling stock to be acquired for this transport includes: 4 main locomotives, 120 ore wagons, 2 motor wagons and two shunting locomotives. A transport study is required to determine to what extent this existing rolling stock may be used for other transport - agricultural produce and small industrial products (to receive priority above human transport which is to occur by road - see page 168. Because of delays in construction of the Kabalebo Dam, the railway will work at its design capacity at a much later date. In this short term period (say till 1985) the present regional plan may be implemented and tested, hopefully making use of the under-utilized railway and its running stock in this period.

This is made possible by the fact that the completion of the railway is scheduled to occur long before it becomes necessary. In effect, the railway should have been the last element to be constructed in the framework of existing plans, but because of rapid construction by Morrison-Knudsen Suriname, it seems as though it will be completed long before it is actually required.

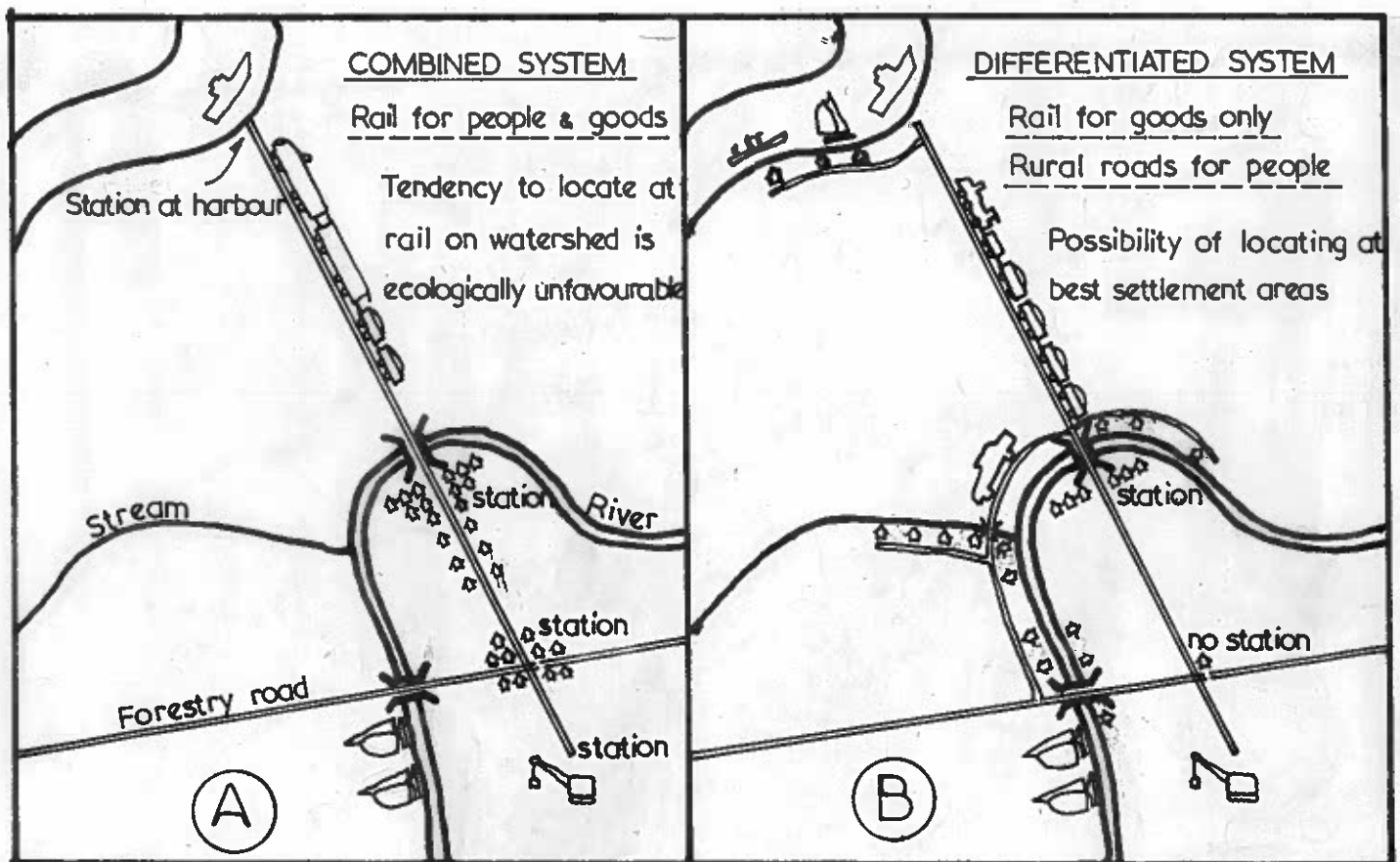
Towards an Integral Transport Plan for the Region



In the following two pictograms two alternative regional transport strategies have been visualized. In A, the use of the railway for transport of both people and goods (combined use) is seen to be inefficient and therefore discouraged. A minimum of four new railway stations need to be constructed at settlements on the railway. As the railway has only a single track, the risk of overloading the transport system is great, a prospect which results in either inefficient transport or the need to build a second railway track at great extra cost.

Preference is given to B, in which transport is differentiated into two main systems - the rural road network which may flexibly serve travel needs of regional inhabitants, and the railway which is used solely for transport of (export) goods to the harbour at Apoera. By differentiating these two systems the use-efficiency of each system is improved - the railway transports heavy goods only at its maximum capacity/efficiency, and the flexible road network is adapted to changing human needs/social desires between settlements, sub- and inter-regionally.

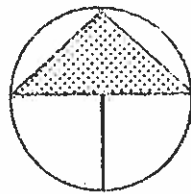
As B is proposed, it is obvious that the temporary mining contractor's Camp 52 will stagnate in preference for attractive villages on the banks of the Nickerie river. This is seen as no great loss, as the temporary facilities at Camp 52 may be re-used in these future villages, where ample water and recreation opportunities are available.



Maximum/Minimum Range of Travelling Distance Enabling Efficient Transport Between Settlements per Travel Mode

Travel distance Travel Mode	Village ←→ Village		Village ↔ Services Centre		Services Centre ↔ Town		Town ↔ Town	
	1 km minimum	4 km maximum	2 km minimum	8 km maximum	6 km minimum	24 km maximum	15 km minimum	50 km maximum
Pedestrian	11 minutes	50 min.	25 min.	90 min.	70 min.	-	3-4 hours	-
Bicycle	4 min.	15 min.	8 min.	30 min.	25 min.	90 min.	60 min.	-
Motor bike	2 min.	7 min.	3 min.	15 min.	12 min.	40 min.	25 min.	90 min.
Car	1 min.	4 min.	2 min.	3 min.	6 min.	20 min.	15 min.	45 min.
School Bus/ Truck	-	5 min.	2 min.	10 min.	8 min.	20 min.	30 min.	50 min.
Train	-	5 min.	2 min.	10 min.	8 min.	20 min.	15 min.	45 min.

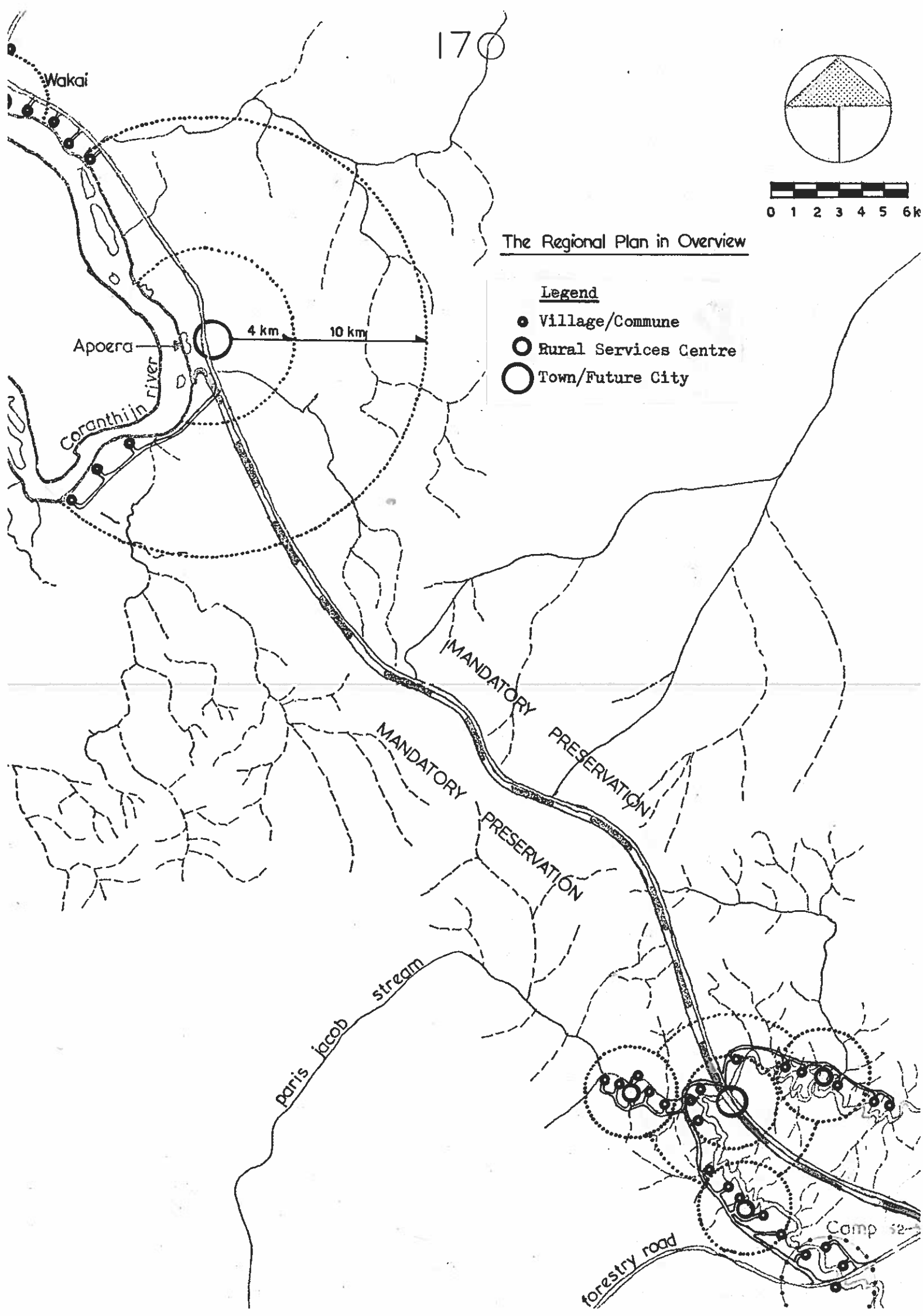
Source: Adapted from Van Dusseldorp, I.S.P. West - Suriname and Rehovot.

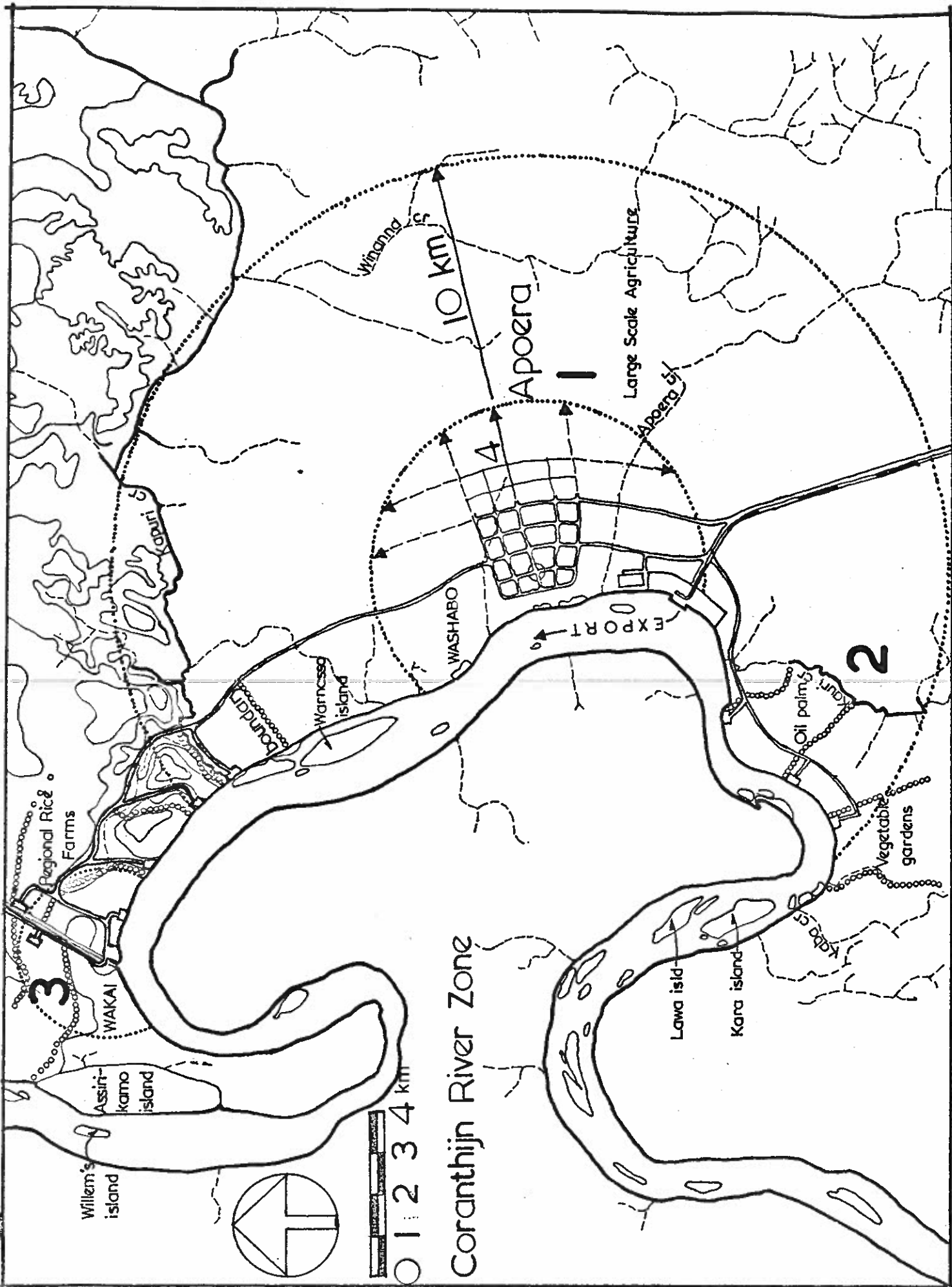


The Regional Plan in Overview

Legend

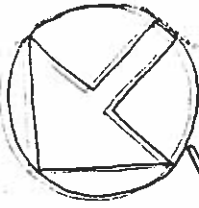
- Village/Commune
- Rural Services Centre
- Town/Future City



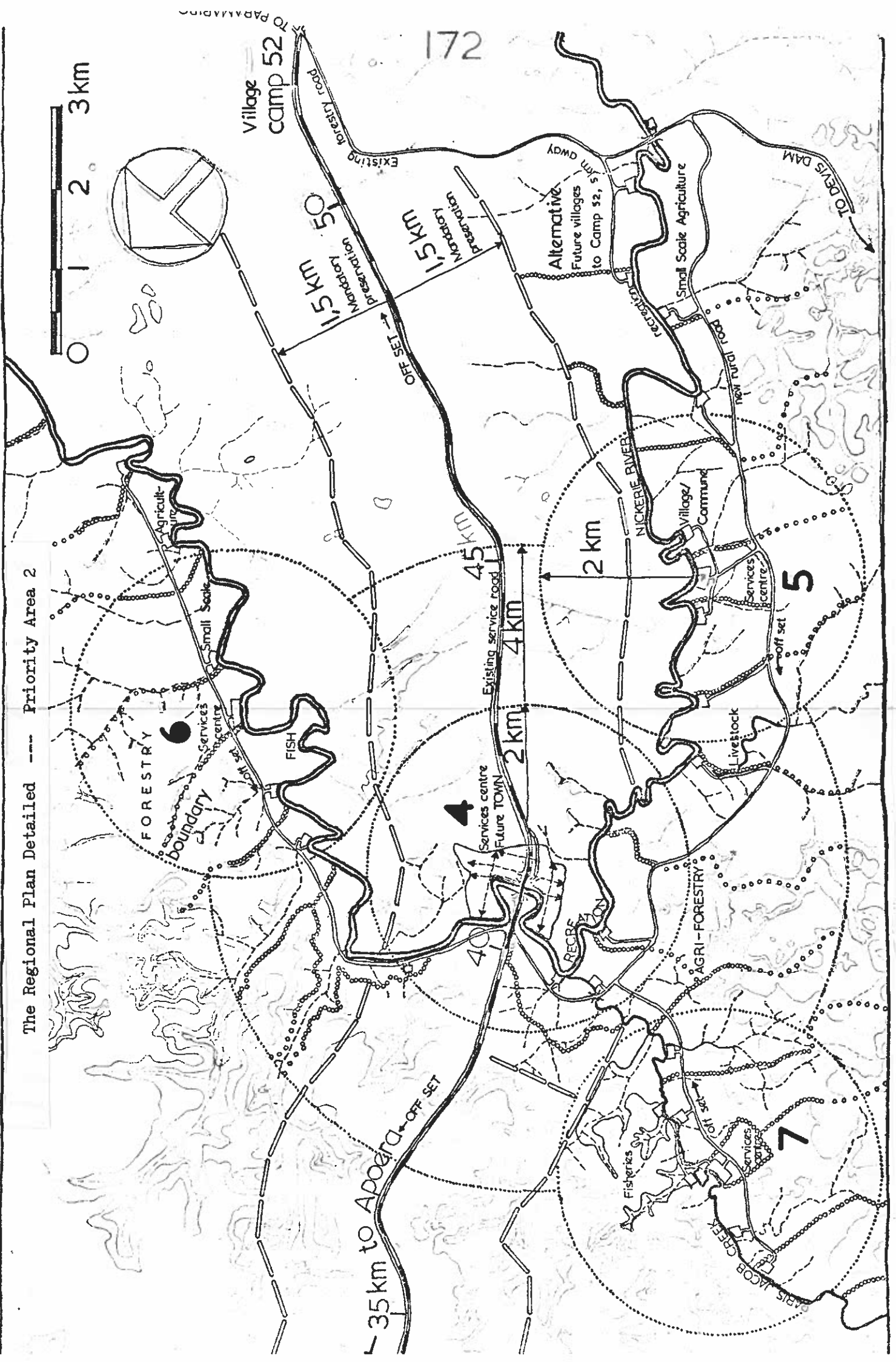


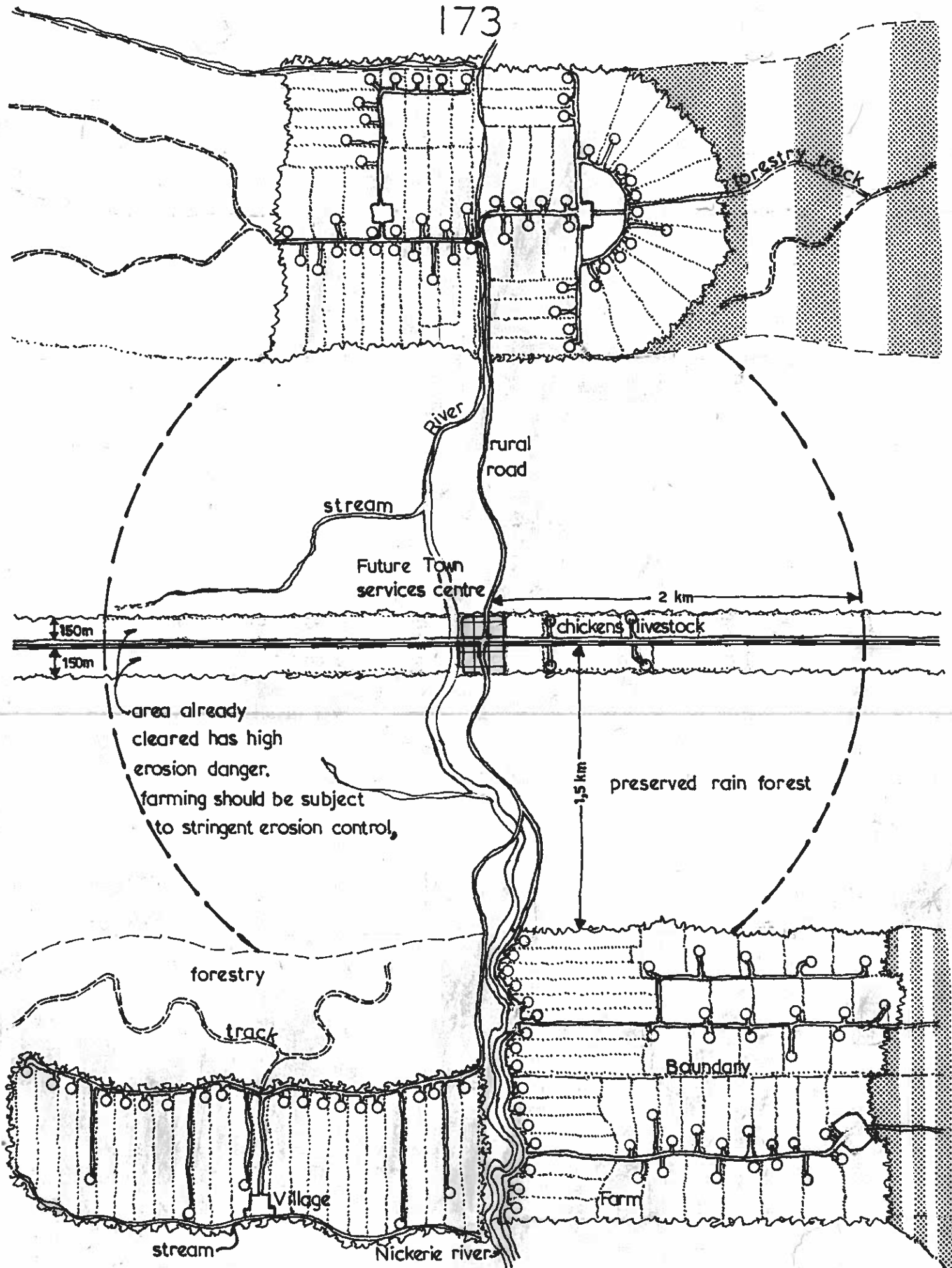
Coranthijn River Zone

The Regional Plan Detailed --- Priority Area 2



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Possible Variations in Detailed Layout: Services Centre and Villages

Water Supply

All proposed settlements have been located at main regional rivers and streams for constant water supply. Rain water collected/filtered from roof run offs is to supply settlers with their household needs. The streams are to provide the irrigation requirements of the farmers; small dams constructed in them may ensure a constant supply. Wells are not to be used because of the effect on sub-soil water --- the rainfall is ample. Irrigation canals or piped supply from the Coranthijn and Nickerie rivers to farm lands provide a constant fresh water supply for agricultural purposes. Adapted irrigation technology is to be designed by water engineers.

Infrastructure

The spine of the settlement structure is provided by existing major regional rivers, the railway forming a link between the comprehensive priority areas, as identified in the Regional Specific Analysis.

Rail transport frequency should closely follow production (bauxite, small industry or agriculture) development/requirements.

Transport between villages - villages; villages - services centres should occur via a rural road system the spine of which is the present service road.

Infrastructure should be of medium to high quality (in comparison with existing standards in Suriname). Electricity could be generated by diesoline generators at all settlements until such time as the hydro-electric electricity from the Devis dam becomes available.

Cultivation

Crops which have been proved suitable by a crop-testing station are to be cultivated in the vicinity of the village/commune where rain forest has been cleared. Where possible existing topography should be maintained. The use of agricultural machines may be supervised by an extension worker and a committee of local farmers. Large scale agricultural production may be crop-tested in the vicinity of Apoera where the vegetation is not rain forest but 'drasbos' or moist almost swampy forest (Grote Bosatlas, 1976). Possible large scale crops (still to be tested) include oil-palm, rice and citrus. Each village is to be self-sufficient as far as possible, as well as supplying services centres, towns, New Nickerie and even Guyanese across the Corantijn with their daily needs.

New Nickerie offers a market for fruit and vegetables as its (large scale) agricultural produce is limited to rice, citrus and bananas.

In the report of the I.S.P. West-suriname 1978, an estimate was made as to the number of hectares as well as the number of farms required for the self-sufficiency of 1 000 people in West-Suriname.

Crop/Livestock/dairy products	no.of hectares	no.of farms	no.of labourers
Rice	40	2,5	1,5
Sub-soil crops (Potato, carrot)	1,2	0,05	0,05
Sugar	11	-	-
Fruit	1,2	0,05	0,05
Vegetables	1,2	1,2	1,2
Bananas	0,4	-	-
Citrus	2,6	0,5	0,5
Beef/mutton	N.A.	0,3	0,6
Pork	N.A.	0,5	1,0
Chicken run	N.A.	0,6	0,6
Eggs	N.A.	0,4	0,4
Milk	N.A.	0,8	1,6
Total	100(3,5x3km)	7	8

Vegetables, sub-soil crops, fruit and bananas should all be cultivated on one farm (mixed cropping) as the latter three crops cannot provide enough productive labour for self-sufficiency of the regional population. West-Suriname could make an especial contribution in the self-sufficiency of the whole of Suriname with regard to meat (beef, mutton and pork) requirements -- I.S.P. West-Suriname, 1978.

According to the Long term Integral Agricultural Development Plan (MIAOP) 1977, production best suited for export is rice, citrus and vegetable oils, (oil palm). Rice may be cultivated best at New Nickerie, but both citrus and oil palm could be cultivated on the sandy soils in West-Suriname.

However, this depends greatly on the outcome of agricultural tests still to be carried out in the region; as well as a thorough evaluation of supply/demand and off-set markets.

The railway has been located on a natural topographical ridge which forms a watershed. It may be assumed that the soil-fertility at the railway is not as high as further away from it. This needs to be verified by site tests upon which advantages of slightly less fertile soil near a quality transport system should be compared to the disadvantages of increased soil erosion possibilities on the watershed, (see Physical Concept).

Agriculture and Livestock at the Settlements

Villages/Communes in the Nickerie river zone: Vegetable gardens at all communes for their own self-sufficiency. Fixed requirements for 250 (min.) persons are:

Sub-soil crops + Fruit + vegetables + citrus + bananas	1 farm	2 ha
Beef / mutton Dairy (milk)		7 ha 3 ha ← 2 farms
Rice (at Wakai)		10 ha ← 2 farms
Sugar		3 ha
Total		25 ha

If the present average small farm size of 3-4 ha, Brandsma (1975), is increased to 5 ha, then 3 farms are required e.g. 1 farm for fruit, vegetables, citrus and sugar cane and 2 farms for beef/mutton and dairy produce. All regional rice requirements are to be met by production in Wakai, the only local area suitable for rice production. This represents minimum requirements for 250 persons, i.e. the minimum number per commune.

Milk and meat could be produced to cater for the needs of all Suriname, which has a shortage at present - I.S.P. West-Suriname (1978). Small scale agriculture for self-sufficiency can offer extended employment opportunities by catering for self-sufficiency of West-Suriname and Suriname - sub-regional markets at Apoera (min.3 000), Camp 52 (min.600), the town at the railway/Nickerie riv. crossing (min.2 000) and inter-regional markets (New Nickerie, Greater Paramaribo) offer employment to half the village population, the other half being employed in the forestry sector. NB: Subject to testing.

Villages/Communes at Wakai: Rice farms for self-sufficiency of West-Suriname may be set up between the river and the Coranthijn canal. Minimum required area = 460 ha = 90 5 ha farms. Meat, fruit vegetable and dairy requirements at Wakai are also approximately three ha a village of 250. In addition, pigs and chicken runs may be kept at the Wakai settlements. The favourable location of Wakai (good soil quality; at the Coranthijn irrigation canal; at short distance via river or road to New Nickerie) stimulates agricultural production.

The Railway Town: Large scale oil palm and citrus, best cultivated on sandy soils, could form the main agricultural production of the town.

Self-sufficiency is soon met with, so export possibilities should be investigated. At present all that can be said in this regard is that further research and feasibility studies are required to verify/falsify the need for export production, which is seen as a long term possibility.

An abattoir in the town with a cold store, as well as one cold storage railway buggy could facilitate production and supply of meat to services centres, Apoera and New Nickerie.

Forestry - Introduction

Because of extensive areas of mora and krappa tree species, West-Suriname is more favourable for forest exploitation with an average of 30-35% of commercial trees per hectare, compared with the rest of Suriname average of 18% commercial trees per hectare, Work Group West-Suriname (1977).

If it is borne in mind that "..... the first phase of the production chain charcoal - chips - pulp is fairly labour-intensive, we have with this form of forest exploitation an almost ideal combination of labour as well as capital-intensive (with pulp production) process, that knows a substantial added value and fairly sure (open) off-set market", I.S.P. West Suriname, 1978.

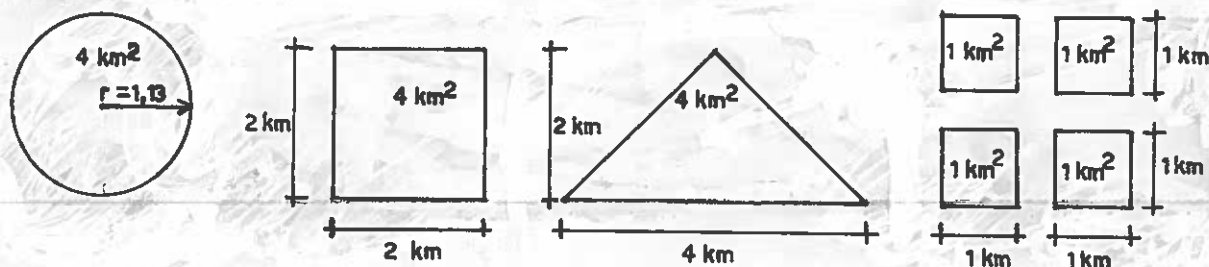
As may be seen in the vegetation diagram the railway lies for more than half its length in the exploitable forest belt. This means that all planned Nickerie riv. settlements, including Camp 52, lie within the exploitable forest zone.

The combination of available quality infrastructure (the railway and future harbour) and exploitable forest with twice as many commercial trees per hectare than found in the rest of Suriname, suggests that a main activity of a Nickerie river zone settlement, besides agriculture should be forestry. In this regard the large scale clearing of forest is ruled out by the small size of the labour force available in each village and services centre. Two types of forest clearing are envisaged:

- a) Permanent clearing: When the location of a village has been fixed, that site and its related farm area for self-sufficiency (20 ha minimum) is to be partially cleared. The creation of rural roads will require permanent clearing of a 100 m strip on either side of the road.
- b) Clearing and re-planting: Natural growth cannot be relied on for growth of forest on cleared areas, therefore planting of selected species in strips should occur on cleared areas. All clearing areas are to be carefully selected and their surface length kept to a minimum. Experience of

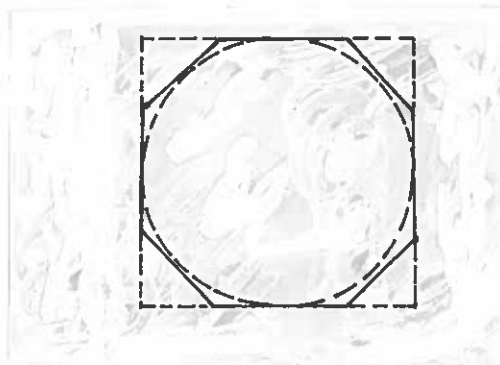
forest-exploiters (e.g. Bruynzeel, Suriname) is invaluable to learn from, and apply in each village in West-Suriname. As with agriculture a forestry testing-station should be set up to determine which species are most suitable for planting in West-Suriname. In this regard profit maximization is to take second place to spatial factors such as countering of erosion, contributing to maintenance of the moisture cycle, etc. Attention must be given to the sensitivity for soil erosion of the cleared areas, the tendency to form savannas and in the last instance the hardening of the area into laterite layers - a phenomenon which renders the soil utterly useless, endangers the envisaged multi-functionality of the settlement production zone, (agriculture/forestry) both at the Coranthijn river and in the railway zone. (See Forestry Discussion, Appendix Report).

As regards surface length of cleared areas, the following theoretical study indicates which clearing patterns have relatively the shortest surface length.



Surface length = 6,5 Surface length=8 Surface length=9,7 Surface length=16 km

If 4 km^2 has to be cleared, the shortest surface length is offered by a circle with radius 1,13 km. As perfect circles are difficult to obtain in practice with machines, this is an impractical clearing pattern. The next best pattern is a square of $2 \times 2 \text{ km}$ followed by a triangle $4 \times 2,8 \times 2,8 \text{ km}$. By 'rounding' the corners of the square advantages of shorter surface length may be combined with partial clearing methods.



Forestry - Exploitation

Selective cutting: Commercial species of suitable size are to be located in the forest and logged. This provides immediate, short-term employment for regional settlers. All major watersheds and sensitive source areas are to be excluded from selective cutting. Complete removal of any one species is prohibited.

Natural Rejuvenation or Refining: The growing rates of commercial species in the rain forest is speeded up by eliminating taller non-commercial trees around the commercial species. In this way the desired species grow more rapidly as they receive more sunlight and moisture. This system is ecologically preferable to complete clear cutting - (Goodland & Irwin 1975), and should be initiated as soon as possible.

Strip Planting: Suitable commercial tree species are planted in partially cleared strips within the rain forest. The existing forest canopy is maintained and gradually removed as the planted trees increase in size. This system requires more intensive labour than forest refining but provides much more commercial wood per hectare - Encyclopaedia of Suriname (1977).

Forest Enrichment: Being the combination of forest refining and strip planting, is forwarded as the most suitable future forest strategy for the region. Forest enrichment provides short-term (controlled selective cutting) and long-term (strip planting and refining) employment for regional settlers. The complete removal of the forest canopy is to prohibited within the entire region, as from all accounts such removal of shade would render soils unstable, infertile and erosion prone - Goodland & Irwin (1975) and Dasmann (1976) amongst others. Agriculture, forestry and all complementary activities are to occur under a fully or partially preserved forest canopy to ensure continued soil fertility, guard against soil parchement and counter soil erosion.

Complementary Activities

Complementary activities which are possible in the region and provide diversity/strength to the regional economic base include the following:

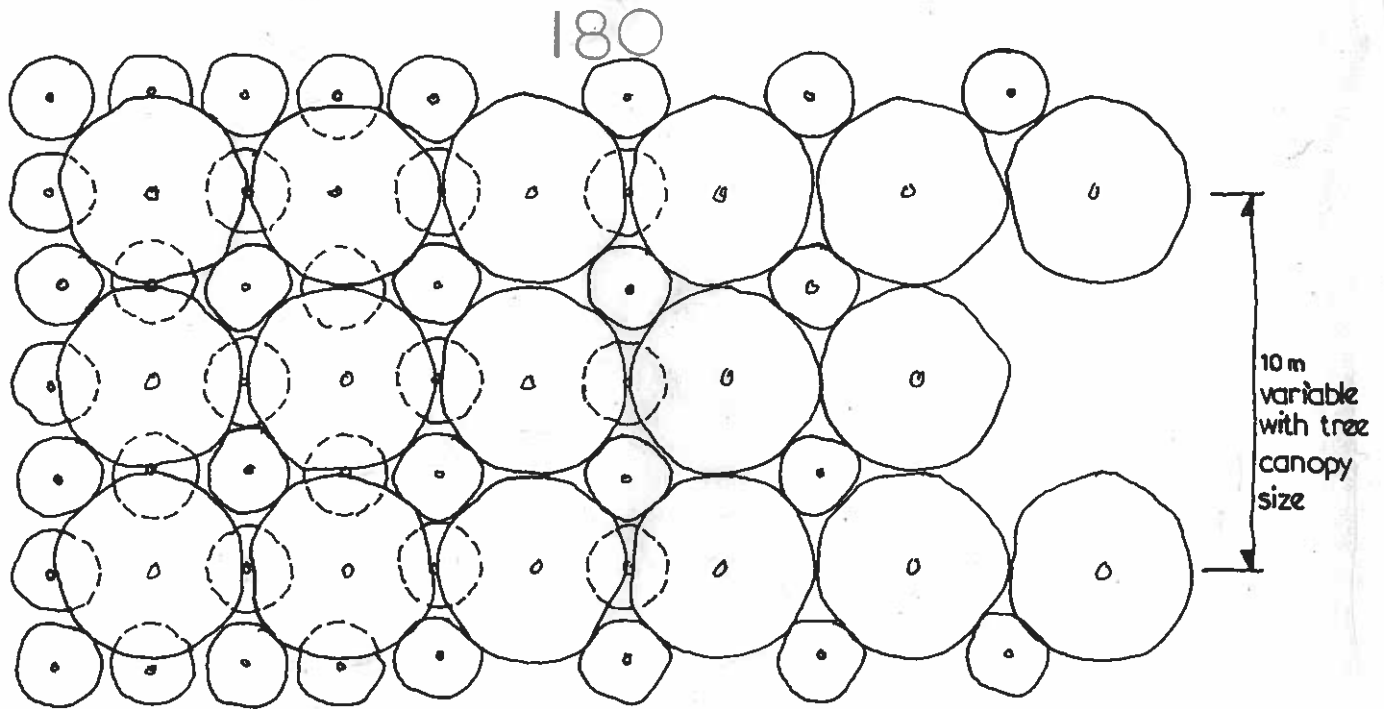
Forest By-Products: Seeds, nuts, flowers, balata latex and palm kernels may be collected in the rain forest without disturbing the forest canopy.

Fishing: Main types of fishing possible in the region include --

River fishing - The Coranthijn, Nickerie and Paris Jacob rivers provide primary fishing opportunities in small boats, using nets or rods.

Creek fishing provides opportunities for export aquarium fishing.

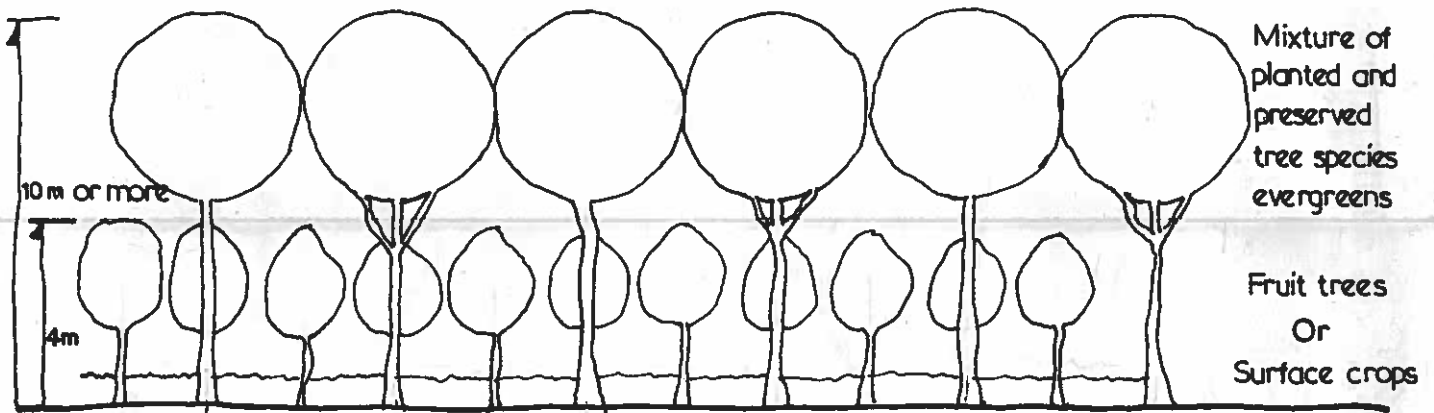
Swamp fishing is possible in the vicinity of Wakai during the dry season.



Concentrated grid
max. even shade

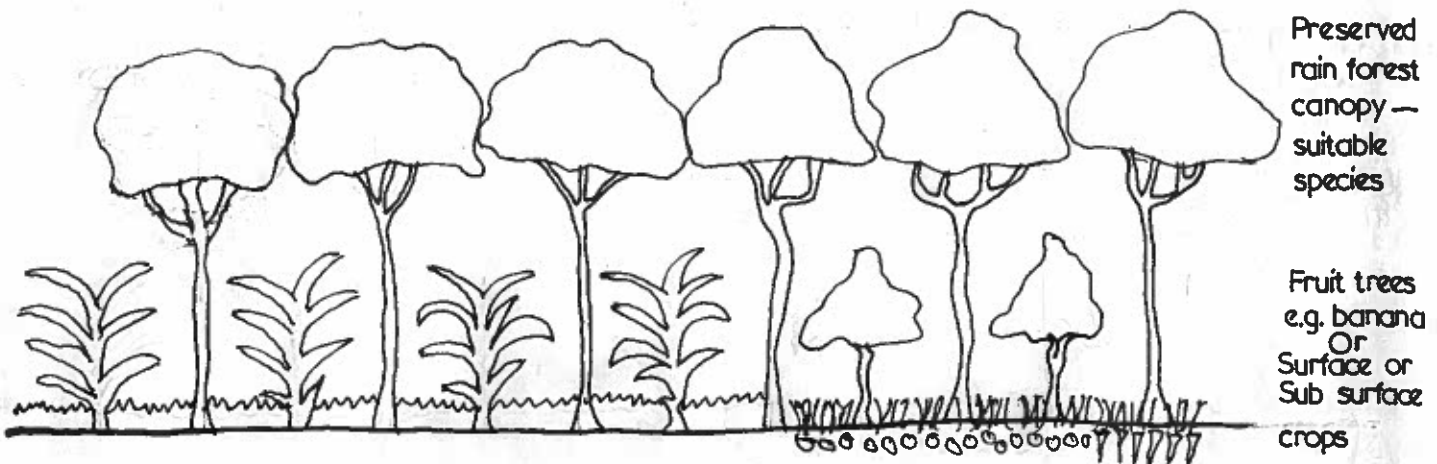
Row/strip
even shade

Open grid
pocket shade



1. AGRI-FORESTRY

Source: TNO Forestry Discussion 1979, Appendix Report



2. AGRICULTURE UNDER A PRESERVED FOREST CANOPY

Source: Goodland and Irwin 1975

7.3 The Social Structure

Target Groups

The target of the regional plan includes:

- existing marginal farmers in the rest of Suriname
- former farmers/carpenters/unskilled labourers who are at present unemployed/marginally employed.
- the women-farmers of Suriname - their role in cultivation is largely ignored at present, and should be recognised by making a point of including them in the participation process. Independent communes run by women should not be discouraged.
- any Surinamese who feels motivated to do something for Suriname (and for himself) whether he is a re-migrant from the Netherlands or a bush-negro.

Basic Needs / Quality of Life

In the first phases of settlement when experience is lacking in cultivation production, the new mode of life, guidance/subsidies from the government are essential. Basic needs must be provided for, machines supplied on favourable terms, and constant monitoring of progress in all villages to learn from mistakes is required.

Houses may be of a minimum size (average family size 4 - 7) but should be designed to grow by simple additions - 2 new walls and a new door makes another bedroom, for example. Extensions to houses or new buildings are to be supervised by a services centre committee and all members of the commune. In this way the skilled may be utilized to help the unskilled. Minimum houses (\pm 50 per village) are to be provided by the government as a stimulus to settlement. Should a village increase in size, the construction of new houses is organized by a services centre committee.

A goal of the development, of which everyone should be aware, is the improvement of the quality of life of all by all. This can only be achieved when everyone does his/her fair share of work each day.

In-Migration

It is difficult, and even hazardous to regional development, to predict exactly which social groups will migrate to settlements in the region. It is hoped that the target group will form the greater part of the in-migrants, but the exclusion of any other group/social class/race is not intended - in this regard the regional plan is open ended as it cannot, and does not wish to express vetoes over specific groups. An applicant survey in Suriname and Holland should be done to clear up this uncertainty.

Villages are suitably isolated from one another to allow them their (communal) privacy and independence. The dominance of majorities over minorities, (or minorities over majorities) should be avoided by regular development-determining elections in rural services centres.

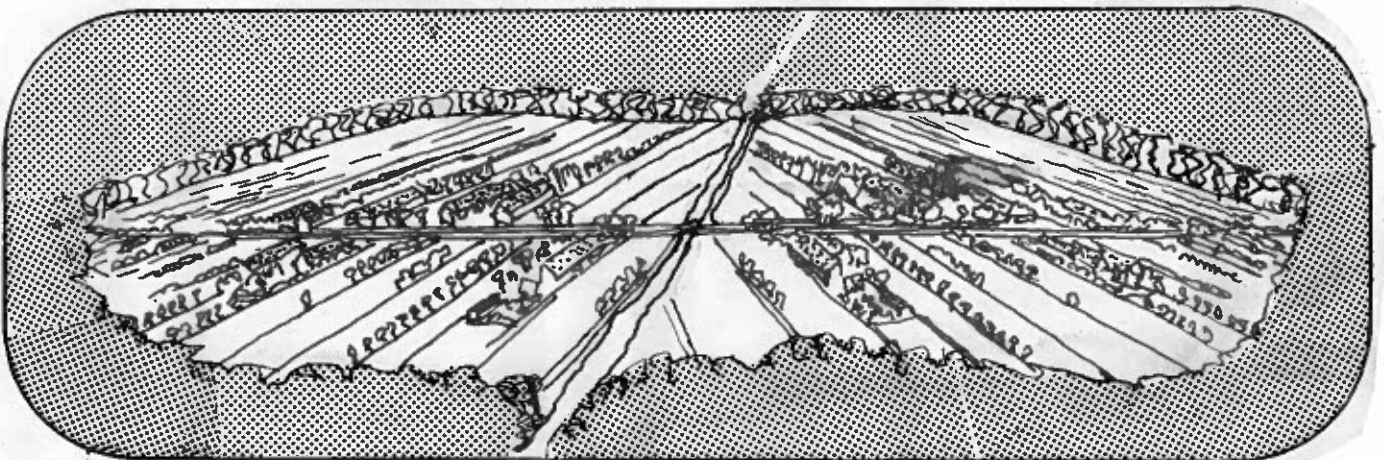
Social Services

The service package described in the 'Regional Spatial Pattern' is of a comparatively high quality, this being a necessary 'pull' to target group migrants from the rest of Suriname. The community centre forms the core of social life, and decision making, and its use should be promoted.

Education with emphasis on the acquiring of basic skills/apprenticeships is much needed. According to Mr Thijm, head of the Planning Office, the lack of semi-skilled labourers (carpenters, plumbers, house builders) is forming a problem in the implementation of the existing plans. Vocational guidance has a strategic role in the alleviation of such shortages and the diminishing of a labour supply/demand disequilibrium.

Social Structure

A social structure in which polarization is kept at a minimum is envisaged in the framework of the proposed regional development. Problems such as patronage, corruption, criminality and prostitution (is this really a problem?!) are to be controlled and hopefully checked by the responsible village/commune. The small size of settlements enables a close monitoring of one another's behaviour (one cannot rob someone and then 'disappear' into the crowds) and this in turn discourages the taking root of the above problems. Everyone cannot but help to know what his neighbour is doing (or not doing) in a village and services centre. Nobody is perfect, but community concern may help to soften imperfections.



7.4 The Economic Sector

The various types of production envisaged for the region are:

Agriculture: Small scale labour-intensive farms are to produce staple diet goods - rice, fruits, oil palm, livestock and poultry. Markets for the goods are provided sub-regionally, inter-regionally, in Guyana and within rapid export range (Venezuela). The virgin soil is fertile and should remain so with proper treatment. Information about field experience in other tropical lands is much needed, as well as the timely (though promised by existing plans, not yet established) setting up of crop-testing stations. Small scale agriculture need not cost much to implement, but the products and investment returns could take a while to become established. In this setting up period, subsidies and guidance from government and agricultural foundations (Wageningen) are essential to attract farmers/unemployed, who cannot (by the best will in the world) be expected to migrate to a region of which they know nothing, thereby abandoning the security they have managed to scrape together. Information and even advertisements are required to put potential migrants in the complete 'West-Suriname Communal Farms' picture. It should be made plain that communal farms are not a sine qua non for development, but ultimately means to the furthering of the individual's (sometimes selfish but mostly survival in the target group) ends, for example. This subtle example, and others like it, beg for clear information and guidance on the proposed development, and that is generally achieved most effectively by personal contact, (also newspaper, television and radio). The productive employment opportunities in agriculture offered by the regional plan are many, (providing a fair balance to bauxite mining/export) and this should be made known in the capital city. See Regional Spatial Pattern.

Bauxite Mining / Export: The production schedule outlined in the existing plans offers employment to 2 158 men by 1984 if everything proceeds as planned. The earnest intention of the present regional plan is to consciously slow down this process to say, 1984 (a somewhat prosaic date) or later. Development funds granted by the Netherlands are not value-fixed and depreciate over time, this being a main reason for the investment-urgency so obvious in the existing plans so as to receive as much value as possible from development funds.

It is proposed to divert the monies for bauxite production (by now much reduced) which become available with slowed down implementation, to

regional-base (i.e. labour intensive, capital extensive small agricultural/industrial) projects located in the settlement pattern already described.

When added together, these projects form a large enough hole (growth pole) in which to rapidly get rid of the 'hot' money: houses must be built at the villages, services centres constructed with facilities listed, soil prepared for agriculture/forestry, transport organized and so on. The implementation of bauxite export is therefore not negated, but slowed down. Perhaps this slowing down doesn't need too much effort - the railway and hydro-electric dam are behind schedule already.

Forestry: Because of a proposed slowing down in mining activity, more time is available for clearing units to systematically clear the site of the future Devis dam. The easiest areas are to be cleared first. This clearing and charcoal production has three functions which cannot be overlooked: Source: Werkgroep Milieustudie West-Suriname (1976).

- 1) It provides productive employment to 1 600 men for 5 years in total. However, as the total clearing of forest at the dam site is extremely difficult in inland undulating terrain, it is proposed to clear the first 1/4 of the dam area -- 2 500 ha in total. In this trial period experience may be gained and economic feasibility of exploitation tested. Clearing units are to be housed at the Devis Falls in a contractor's camp. Charcoal could be transported via the Corantijn river, or by road past Matapi. Feasibility is to be subjected to further study.
- 2) Navigation and fishing on the dam is possible only if cleared of forest. Control of water quality is made easier when rotting tree stumps aren't present in the dam. The World Bank may not finance the dam if not cleared.
- 3) Recreational and touristic use of the dam can occur only once the dam has been cleared, otherwise its swampy, rotting appearance cannot exactly be termed 'a fine view of a tropical lake'. Rowing, water sports and swimming are all possible in the dam once (partially) cleared. Rain forest animals are given a chance to escape with gradual clearing, they would be drowned in large numbers should the forest be inundated.

Forestry and related small scale industries are to become one of the main production activities of the village/commune. Here yet again the railway is an important existing infrastructural element which enables easy transport of heavy timber. Because it already exists (but for sleepers) and is a high-

quality bulk transport form, the railway's presence in the region decreases costs of any production which can directly or indirectly make active use of it. Two small saw mills (such as already constructed at Apoera) are to locate in two services centres to produce for local inland needs.

A report of the 'Werkgroep West-Suriname' (CONS) has estimated that the total labour force in the forestry sector of West-Suriname will be 1 480 in 1987. This means an average of 148 new employment opportunities each year, which in turn means 600-900 more people in the region, (family size from 4-6) per year.

The following assumptions indicate what this forestry labour force means to the present regional plan if integrated in the settlement-range.

Assuming that in a village/commune: 50% of the working male (or female) population are fully employed in agriculture = agriculture (25%), fishing (15%), by-products (10%). 50% of the working male (or female) population are fully employed in the forestry sector = 25-30 foresters with an average family of 4-5. On average, if the proposed plan successfully survives the Testing Period, an average of 25 village/communes will be present in the region. If each village has 25 foresters, then a total of 625 foresters (25x25) must be accommodated in all villages by 1985. However, extrapolations from the CONS 'Werkgroep West-Suriname's' estimate (1977) indicate that 900 foresters could be/should be present by the same date. This indicates that the proposed regional plan is not too unrealistic as it does not exceed the number of foresters as estimated by the CONS; on the contrary, a total of 275 employment opportunities (900-625) remain in this sector which could locate at services centres and the two towns (e.g. 35 at each services centre and 65 at each town).

Other Sectors

The rural services centre and town provides employment which is not always directly productive, but essential to the efficient working of the settlement-range. Those knowledgeable in trade, business and management will naturally gravitate towards a services centre or town. Over-concentration in a services centre should be guarded against to avoid marginal employment by establishing a maximum limit zone for centre-size in a town planning statute, for example.

Large scale agriculture in the vicinity of Apoera (oil-palm) should, as with the bauxite mining, be consciously left for the long term, say after 1990. The 90 million for cultivation of 10 000 ha (30 x 35 km) is needed now in the rest of Suriname.

7.5 The Managerial SectorThe Rights and Future of Local Inhabitants

All the Indians in the region are to retain the land they are at present living and working on, be that at Apoera, Washabo or Matapi. New settlements, roads or infrastructure are not to encroach on this land, to be established by law and made known to the Indians concerned. The desires of the Indians with the regard to the role they see for themselves in regional activity, should be respected. As most of them have already been adversely affected by developments, their participation in any future development/decisions is essential to acquire their cooperation and restore their confidence in the future. To this end the regional plan should be carefully explained to them as well as the role they could play in it if they should choose to.

The Managerial/Organizational Task

The rural services centres, of which Apoera is also one in the initial development phase, are considered to be the managerial heart of the regional plan - implementation, co-ordination and supervision. The task of inhabitants of such centres is therefore a responsible and exacting one, especially that of the rural development committee, counting 10-20 members, which is to be established at each rural services centre. These committees are responsible for plan co-ordination, an open participation structure in which everyone can voice his desires/opinions/grievances, organizing of employment, transport/storage, and essential activities such as school transport and communal get togethers.

The rural development committee is to be made up of two members of each village which have been elected by that village.

Each village/commune is responsible for its own production activities and way of life, but has to function within the guidelines of the rural development committee.

Taxes are paid by each village, either individually or as a unit (depending on which arrangement is preferred by the villagers) to the state for transport, education, health care and so on. It is proposed that the distribution of new land be under the auspices of the rural development committee. The setting up of a long term lease plan, in which villagers pay a nominal lease fee to the state, is proposed to safeguard the rights of the target group; the one drawback being that villagers know that they are always farming on someone else's land. An advantage of such a lease plan is that immediate opportunities are offered to those who would otherwise

not be able to buy land. The selling of land to farmers has drawbacks:

- it encourages the profit incentive which increases prices asked for land, thereby excluding poorer people (target group) from participation in regional development.
- even if land is sold relatively cheaply, more land can be bought by richer farmers/companies, leaving a smaller share to poorer people. A monopoly of land ownership by a few rich farmers or companies is directly counter to village/commune social structures and efficient function. Polarization (as seen so often on farms in Latin America) results, in which rich land owner's produce excludes village produce by superior farming techniques, larger amounts and faster transport. The village produce cannot compete in quantity or quality, and transport to markets, with the result that it becomes redundant and provides villagers with little or no income.

The above drawbacks may be countered by strict control and equity in the distribution of land, but this control has to be constantly maintained in the free market system, whereas this is not a pre-requisite of a long term lease plan.

Extension workers (one to every services centre) are required to guide villagers in their production techniques and improve these where possible. Extension workers should be knowledgeable and experienced in their field, be it agriculture or industry, and have adequate knowledge of regional-specific production problems. They are therefore closely connected with the activities of the crop-testing station and should be 'in the know' when settlement commences.

Serious legal matters (crimes, disputes) may be referred to the court in Paramaribo. The creation of an 'Authority for West-Suriname' is discouraged as its very name implies authoritarian top-down decision-making. However, the institution of a regional development council is proposed, this council having one representative from each rural services centre development committee, and a maximum of five full-time state employees who are knowledgeable and concerned with the development of the region. Should differences of opinion arise between the Regional Council and the rural committees and they are of strategic importance to development, the matter should be put to the vote within both regional council and rural committees.

Regional Planning Department

A regional planning department is to be established in the region to advise and make proposals if called upon to do so by any-one in the region. Its main task would be the monitoring of the total implementation of the regional plan, and as such it is a main planning co-ordinator. The timely construction of houses, schools and hospitals should be ensured by this body and participation of new inhabitants in development (through this department) be enabled.

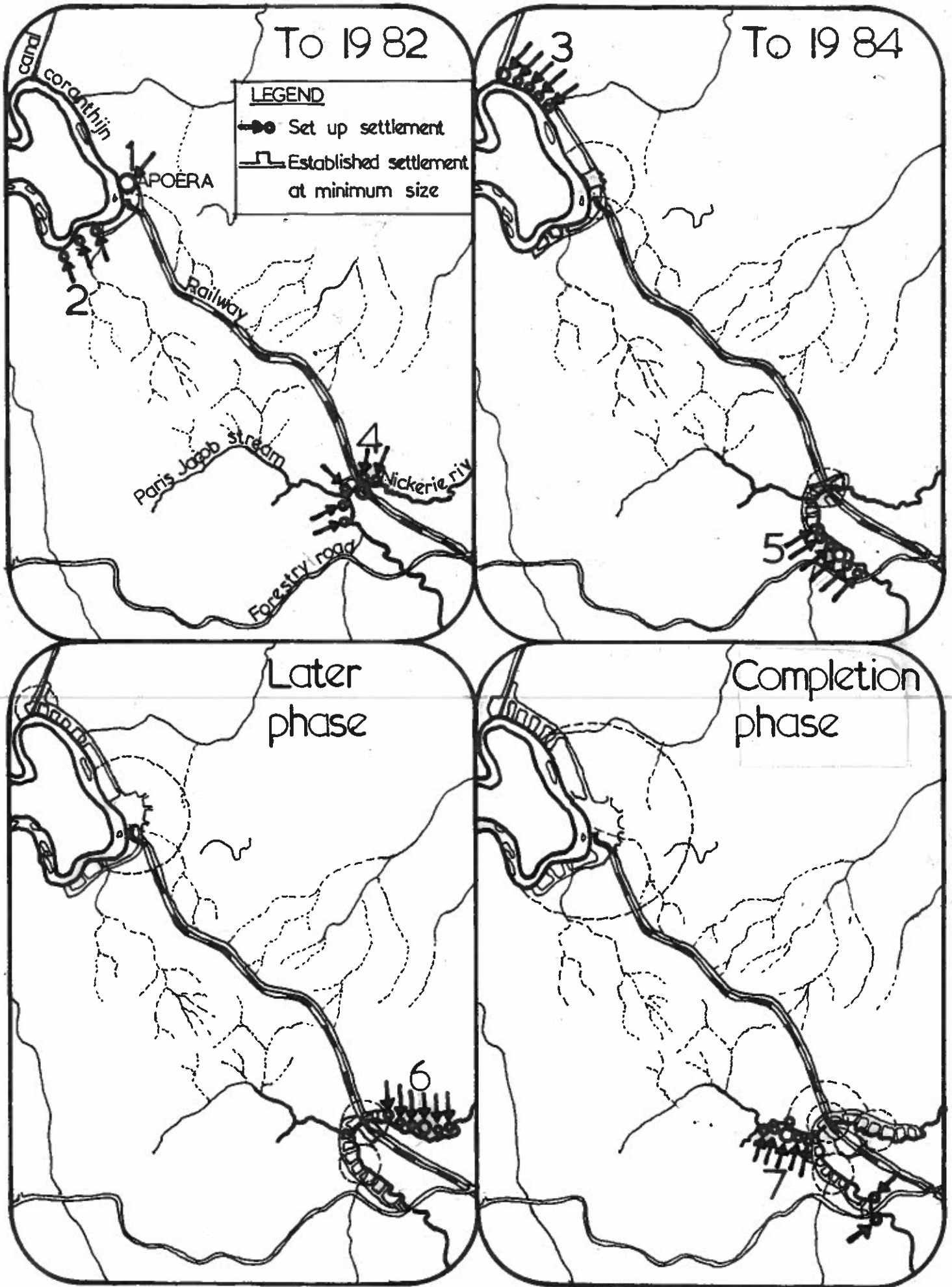
All projects, new buildings, proposed changes in land use are to be scrutinized and evaluated by the department when these have been received directly or forwarded from the regional council/rural development committee.

7.6 The Development Process

Phasing of Implementation

The phasing of the implementation of the proposed regional plan is visualized in the following tabel. See next page for location no. positions.

Location number	Year	1980	1981	1982	1983	LATER PHASE	COMPLETION PHASE
	Inhabitants Area/Settle- ment		1000	2000	3000	4000	5000
T E S T I N G P E R I O D							
	<u>Coranthijn riv zone</u>						
1	Apoera	→					
2	3 settlements south of Apoera		→				
3	4 settlements at Wakai				→		
3	1 services centre at Wakai				→		
D E P E R I O D							
	<u>Nickerie riv.Zone</u>						
4	4 villages/communes	→					
4	1 rural services centre		→				
5	4 villages				→		
5	services centre for above villages.				→		
6	4 add. villages					→	
6	services centre to above					→	
7	4 add. villages						→
7	services centre						→
4	Town (to full size)		→				→



phasing of implementation

Critical points in the phasing are:

- 1) When Apoera has 1 000 inhabitants (assumption: by 1981) the three villages/communes are to be constructed. Preparation of plans, recruiting migrants and crop testing starts in 1980.
- 2) The setting up of 4 experimental villages/communes in the railway zone commences midway through 1980 and continues to 1982 (including testing of results obtained from the experiment). At this stage the region has 7 experimental villages in all, one services centre and one small town, representing a total minimum population of 3 000. The period midway 1981 to midway 1982 (1 year) is explicitly set aside for testing/evaluation of the progress made (or lack of it) by settlements in social, economic, spatial and managerial fields.
- 3) Should the results of the testing phase prove favourable the setting up of the remaining villages, rural services centres and town commence (1983 & later). If the experiment shows no chance of success after the testing phase, the remaining implementation phases of the regional plan are to be cancelled. Should the testing phase prove to be too brief to evaluate advantages/disadvantages of the plan, it should be extended as long as is deemed necessary, the implementation of the rest of the plan being put off for this additional period.

It is hoped that the above phasing program is flexible enough to allow for the experimental nature of what has been proposed by the regional plan, in that proposals are subject to results obtained after testing.

Testing of feasibility must be comprehensive - profits/losses, social benefits/problems, (consult villagers), managerial/organization and spatial problems are all to be considered before deciding on the future implementation of the plan.

At a level of horizontal planning co-ordination, the town could be implemented at an earlier date, depending on the relative success in the establishment of the villages and services centres. A too speedy implementation of the town can introduce a conflicting 'pull' on the inhabitants of the communes/villages, enticing them away from the services of the services centres - thereby endangering the chance of the latter to attain full viability/size. Therefore, although the rural services centre with its villages at the Nickerie river, (location no. 4) is implemented early in phasing (1981), the building up of the rural services centre to a town at location no. 4 occurs only when two additional services centres (at location 5 and 6) are operational.

Phasing of Implementation per Activity

The most important aspect to short-term phasing is that the region should be self-sufficient with regard to local basic needs. Seen in this light the mining and production of bauxite, the phasing of which has been described in detail in the ISP West-Suriname's reports, is not seen as the most important aspect to development of the region. At present various delays and negotiations have jeopardized the planned implementation of bauxite mining - all to the good of the small scale activities in smaller settlements which should be well established and proven by the time mining and its related industry at Apoera come into their own.

The phasing of implementation as outlined and visualized has been set up in gradual steps, even though the numbers of inhabitants and size of activities are relatively small. Two main factors in activity phasing are of strategic importance to a sound regional economy:

1) Continuity of Employment: By gradually allowing more settlers into the region all settlers are given time to establish themselves and their productive activity within each village/commune i.e. pressures of time, risks of failure do not weigh heavily on the settlers, and they have a better chance of strengthening (consequently retaining) their jobs. A guarantee of continuous employment in the large scale, capital intensive mining sector is a difficult one to give. Rapid spatial and financial changes lead to rapid employment changes - hiring and firing in the mining sector could be reduced by a less rapid (than planned at present) implementation of bauxite exploitation.

In the smaller scale, more diverse sectors such as agriculture, forestry with its by-products and fishing, a continuity of employment is enabled by the very diversity of possible activities e.g. a farmer may supplement his income by fishing and/or production of one or more forest by-products.

2) Full Employment both on Short and Longer Term: A great danger in implementing the regional plan is that of surplus or shortage, a danger which should be carefully monitored during the proposed implementation testing period. Examples of this problem include:

- a) A region filled with miners, industrialists and foresters which has to import its basic foods from elsewhere as there are no farmers.
- b) A region filled with farmers and fishermen who do not have regional/national off-set markets for their produce.

To counter the above two extremes, a balance between food supply and demand, timber supply and demand, and bauxite/alumina supply and demand is of the

utmost importance. This has been conciously strived for in the phasing of implementation. In the short term a minimum of 3 000 regional inhabitants will require a constant food supply (2 000 at Apoera, 600 at Camp 52 and 500 at Nickerie river services centre), and this means a need for at least 25 full time farmers. As Apoera grows in size because of its industries and harbour, more farmers will be required to supply food to what is planned to ultimately become the second largest city in Suriname.

Coupled to the needs of Apoera are the needs of the three services centres at the Nickerie river and the expanding agricultural town representing a minimum of 3 000 inhabitants in need of constant food supply.

All in all, the total minimum number of farmers required by 1986 (extrapolated from proposed sizes of service settlements solely within the region) both to supply regional settlements and to remain self-sufficient, i.e. a total regional population of 22 000 by 1987 is 200.

Assuming 8 villages at the Coranthijn river and 15 at the Nickerie river by this date a minimum of 10 farmers per village, 20% of the village population will be required to ensure that the region remains self-sufficient.

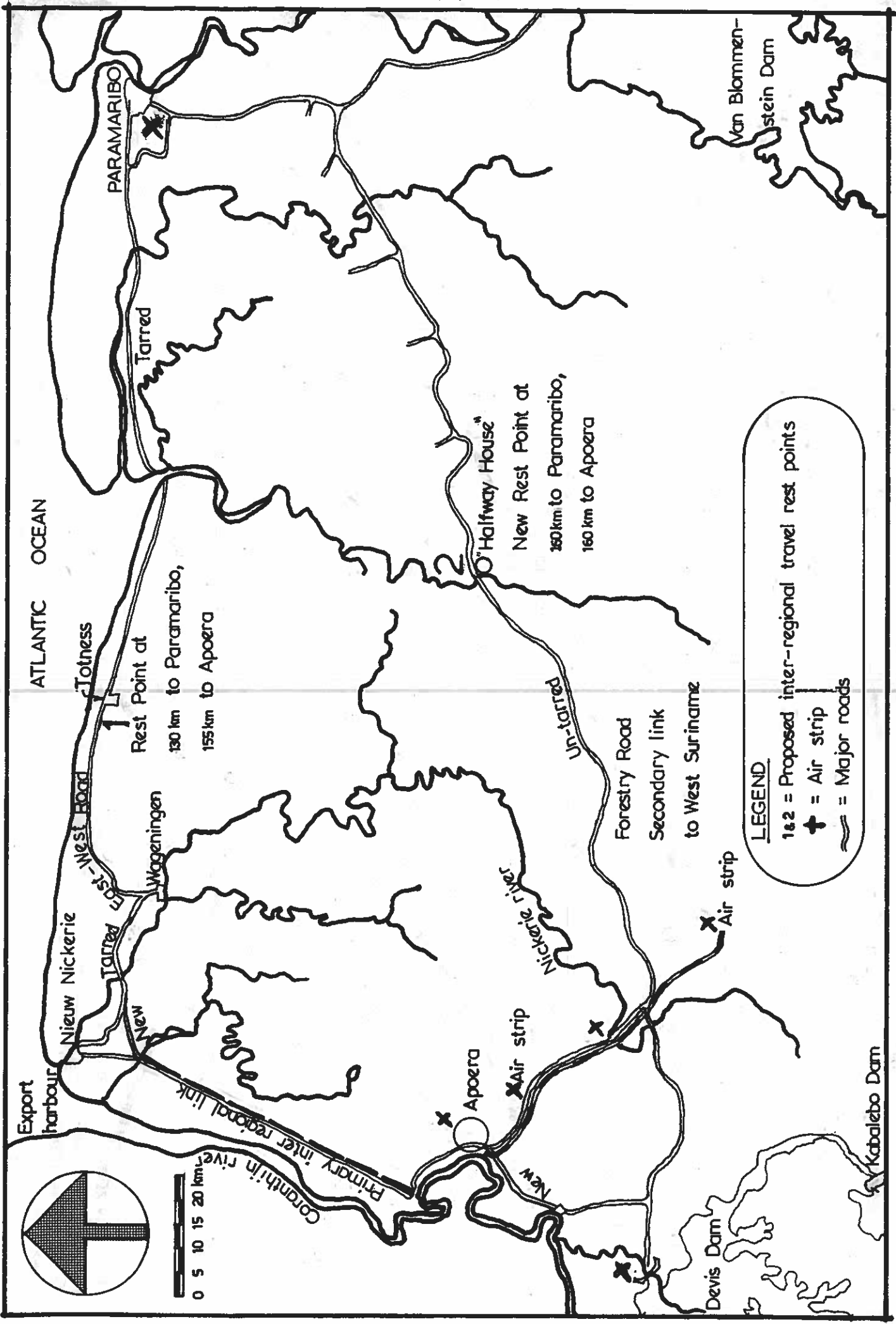
The estimated growth rate of the region in number of inhabitants is:

settlement \ year	1981	1982	1983	1984	later	complete	Total
Apoera	1 000	1 000	1 250	2 000	3 000	1 500	9 750
Nickerie town	- - -	500	500	500	500	500	2 500
Camp 52	600	- - -		250	300	350	1 500
Services centres	- - -	250	250	1 000	500	500	2 500
Villages	500	1 250	1 000	1 500	1 000	500	5 750
Total	2 100	+ 3 000	+ 3 000	+ 5 250	+ 5 300	+ 3 350	22 000
Min. nr. required farmers	20	+ 25	+ 30	+ 50	+ 50	+ 25	200

From the above tabel the following estimate of division of village labour would provide full employment to each village both in short and long term.

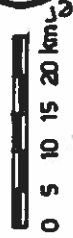
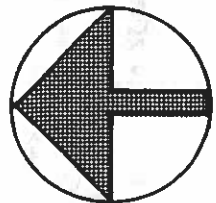
<u>Sector</u>	<u>Estimated Required Percentage</u>
Forestry	45%
Agriculture	20%
Fishing	15%
By-products	10%
Services	5%

The estimate for agriculture does not include farming for export purposes, or farming for inter-regional off-set markets.



LEGEND

- 1 & 2 = Proposed inter-regional travel rest points
- + = Air strip
- = Major roads



inter regional linkages

7.7 Management of Uncertainties - Towards Realism in the Proposed Regional Plan.

Of importance to the realism of what has been proposed in the regional plan, are the uncertainties and assumptions which occurred and their effect on the outcome of the regional plan. Before asking whether the present regional plan is realistic, major uncertainties, and their resultant assumptions which cropped up should first be indicated to get an idea of the premises on which the proposals are based. Each uncertainty forms a recommendation for further study.

The Operating Environment (UE)

In the operating environment (UE = the regional plan area) to be controlled the following main uncertainties are identified:

- 1) Detailed information about factors such as soil structure, exact location of streams, contours, is not available at present, which means that exact location of smaller settlements is subject to further on-site analysis.
- 2) Precise effects on tropical vegetation of diverse types of activity cannot be determined as there is so little information on this subject at present, e.g. no firm proposal can be given whether it is better to implement mixed cropping or mono-cultures at small or large scale - too little is known about the effects of each activity - type in tropical areas.
- 3) The future behaviour of the Indians in the region, even should they be included in decision making, is unpredictable - they could choose to isolate/distantiate themselves from development.

Policy Values to Guide Control (UV)

Policy values include the viewpoint, goals and objectives which have been formulated by the planner. Political decisions are involved in formulating the guide lines to control - different viewpoints would produce different goals and ultimately different regional plans.

Uncertainties in policy values include:

- 1) Viewpoints and goals are not always subject to rational explanation/justification - they remain a source of subjective certainty but a major source of objective uncertainty when seen by someone with differing points of view. In this light what may be identified as a problem by someone, may be seen as a solution to another problem by someone else, for example.

- 2) The planner's policy values identified the problem field - the question of which the planner should be and other are aware is: Is the problem field wide, but at the same time specific enough to realistically inform regional planning? This remains uncertain to the planner in that he is (should be) aware that there should always be room for change in policy values when new information/problems are identified. In this way assumptions may be eliminated from the planning process.

Interrelated Decision Areas (or Policy Areas) Controlling the Environment (UR).

Spatial Decision Area Uncertainties in this decision area which require further analysis/information include:

- 1) Effects of specific action on the environment
 - large scale clearing in one area vs. clearing of scattered small areas.
 - striking of wells for water supply of small settlements on sub-surface water levels.
 - planting selected tree species in areas cleared of rain forest.
 - various types of crops and their action (dehydration, exhaustion) on the soil.
- 2) Suitable road-types and house-types for a tropical climate. Heavy rains, flooding, overhead sun all have to be allowed for in appropriate design/construction of all types of infrastructure which could have an effect on settlement layout and distances of settlements from one another. This means that certain decisions depend on future (technical) input and experience.

Social Decision Area. Uncertainties include:

- 1) Who migrates to the region? Statistics show that at least 1/3 of Paramaribonese are unemployed. It is logical (therefore assumed) that should they be offered opportunities of employment and improved life style in West-Suriname, many of them will migrate to the region. Or is it? An applicant survey should be initiated to verify this. However, at present many requests for sites in Apoera have been received from diverse shop-owners even with the lack of publicity present development is getting.
- 2) How feasible are communes in Suriname? Potential re-migrants in Holland favour co-operatives (discussion with Rodgers 1979) but will they necessarily re-migrate to West-Suriname? Various interviews (Van Waesberge, I.S.P. West-Suriname) and films (Women of Suriname 1978) indicate there is a strong awareness/critical appraisal of present government policy.

Political parties within Suriname (Volkspartij) and unions (PALU) actively promote co-operatives. A base already exists in Suriname as well as outside it (re-migrants) for the creation of co-operatives but the efficient implementation of such co-operatives/communes remains an uncertainty until actively and firmly promoted as outlined in the regional plan.

Economic Decision Area Economic uncertainties include:

- 1) How much money is still available to invest in West-Suriname, bearing the problem of national spatial equity in mind? This uncertainty is allowed for by keeping costs of all proposed alternative development to a minimum.
- 2) What is the cost of the proposed development relative to the expected benefits from it? This uncertainty calls for accounting and cost-comparisons with other possible development projects. Relative cost of travelling, building and producing in a fairly isolated region should be considered, e.g. as regards forestry, West-Suriname has 35% commercial wood per hectare, in the rest of Suriname this is 15-18%. These figures indicate that West-Suriname offers twice as much profit potential. Costs of infrastructure and transport need to be compared before exact profit-potential in West-Suriname relative to Suriname can be established. Cost comparisons like the above done by Surinamese experts in their field will reduce present uncertainties.
- 3) What are the relative sizes (requirements) of possible off-set markets at New-Nickerie, Paramaribo, Guyana and even Venezuela?

Managerial Decision Area

- 1) Does Suriname have a managerial structure capable of implementing, stimulating and adjusting the proposed regional plan? Basic managerial pitfalls (patronage, extended bureaucracy, corruption and favouritism) in evidence at present need to be avoided to ensure efficient working of proposed development, and it is uncertain whether such hindrances can be swept away when the new start is made in West-Suriname.
- 2) With two joint-ventures Billiton (Shell) has already managed to get a 50% hold on mining production in West-Suriname. Do not this, and other joint ventures, strongly jeopardize alternative future developments in the region? Foreign companies do not have as strong a foothold in West-Suriname as with Brokopondo, but their desires/demands could adversely affect implementation of the regional plan.

Assumptions

Assumptions, though not always obvious to the planner, have been made in the course of generating the present regional plan. Some assumptions are critical in that should what has been assumed not take place, the feasibility of proposed development is directly affected.

Spatial Assumptions

- 1) Present available information on the region (maps, books, papers) is correct; verification of such information (comparison with other sources) has not always been possible. Faulty lines on a map could influence the regional plan; maps of too small a scale complicate exact spatial decisions.
- 2) The railway with running stock will be completed as planned, and freight ships acquired for transport of regional products.
- 3) Small settlements, towns, and rural roads, if properly planned, will not affect the expansive rain forest structure over-adversely. This is an assumption which begs for more information, site testing.

Social Assumptions

- 1) Present unemployed, previous farmers and low income groups will utilize opportunities offered to them by the regional plan.
- 2) A socialized system of communes, bearing present social awareness in mind, is possible in Suriname, in which small scale agriculture (crops, livestock) and small scale industry (forestry, carpentry) forms main productive activity.
- 3) The co-operative/commune is a useful social tool which enables both individual and group to improve themselves. This assumption is not too critical, as indicated by case studies and literature on the matter.

Economic Assumptions

- 1) Enough money is still available to implement the regional plan, because it is of a small scale and diverts money from the expensive mining sector.
- 2) Benefits offered by proposed development to the 12 500 (minimum) future inhabitants will exceed costs because costs per settler are kept at a minimum.
- 3) Sources quoted (MIAOP, Prosur, and Activities in West-Suriname) have got their facts right on export possibilities (rice, vegetable oils and citrus) and markets for forestry products such as pulp, chips and charcoal.

Managerial Assumptions

- 1) Adequate experience and know how is available in Suriname which may be drawn on for the management of the proposed regional plan. Not a very critical assumption, as the presence of small/large scale farmers and industrialists is well known.
- 2) Proposed development is of such a (small scale) nature that joint ventures/large loans/ external know how need not be required. However learning from other countries/regions experiences is essential.
- 3) Democratic, bottom up participation as proposed in the plan will be efficient once introduced. It may well be that certain low income groups ultimately prefer to be told what to do rather than decide this for themselves. Co-operation in small groups would make such decisions group-responsibility rather than individual responsibility.
- 4) The present government will decide to implement the alternative plan as proposed in the region.

The Realism of the Proposed Regional Plan

Having outlined uncertainties and critical assumptions which affected substantive proposals, an evaluation of the degree of realism of the plan is possible.

Only one uncertainty, and one assumption is theoretically enough to jeopardize the feasibility of the plan, let alone unforeseen aspects unknown to the planner. The conclusion to be drawn is that the plan (any plan) is implementable, but its feasibility depends on the clearing up of uncertainties/assumptions (outlined above) by further analysis, fact-finding and on-site testing. The critical factor therefore becomes studies of especially those areas of uncertainty (and assumption) which have been described above, to obtain more certainty of detailed courses of action in the framework of the proposed regional plan.

Also critical is the outcome of the testing phase which has been prescribed in the phasing of the implementation of the regional plan.

PHIASIE 8

8.0 Evaluation of the Work/Planning Process and Substance8.1 Substantive EvaluationNational Spatial Equity

An inter-regional disequilibrium is thought to be unfavourable within Suriname, especially when already inhabited regions slump back because of lack of attention/investment causing extreme social misery, (forced migration to the primate city) to the inhabitants. It should be remembered that for the most part this process has already occurred in Suriname, 70% of the working population living in one city. The problem confronting Suriname now is how to achieve a productive equilibrium between city and region, town and rural area. As a contribution to solving this productive problem, as well as other problems (poverty, poor education, health care, limited scope for existing farmers, utilization of resources) the inhabiting of virgin, frontier region land is proposed, and localised to West-Suriname as vast efforts/investments have already created a transport network of high quality for bauxite mining and export purposes. When utilized for rural-regional settlements, the following benefits are possible:

- promotion of regional self-sufficiency in daily needs
- more efficient use of expensive railway and harbour
- diverse activities/production stabilizes regional economy.
- inexpensive production may be implemented making profits possible.

Testing proposed plan against existing and other plans

The ideas of Drs Chin and Mr Sedney and the I.S.P. West-Suriname, though different in many ways, all embrace the risk factor of rapid large scale bauxite mining. Mr. Sedney's idea of transporting ore to the existing industry at Paranama has two major disadvantages:

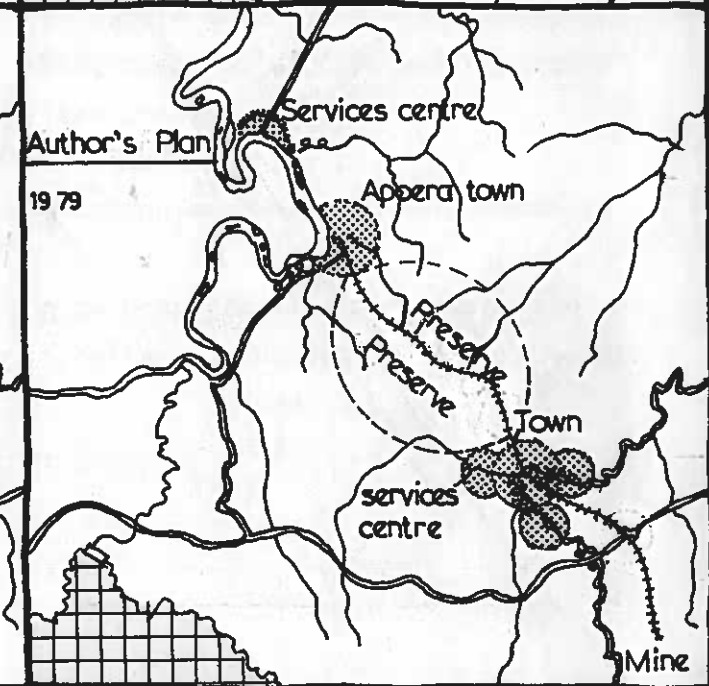
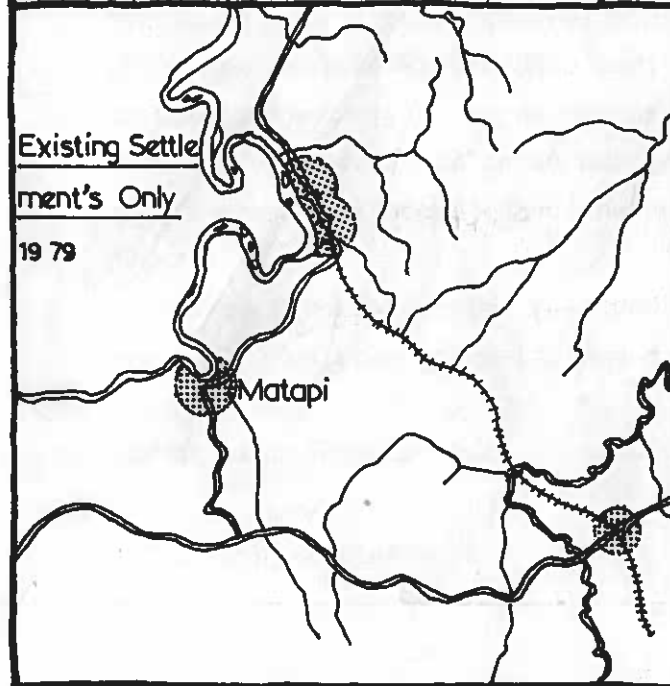
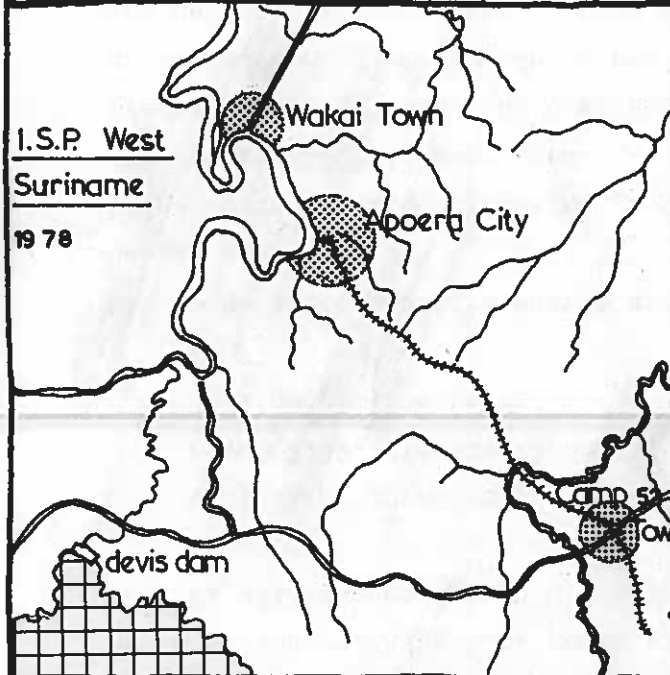
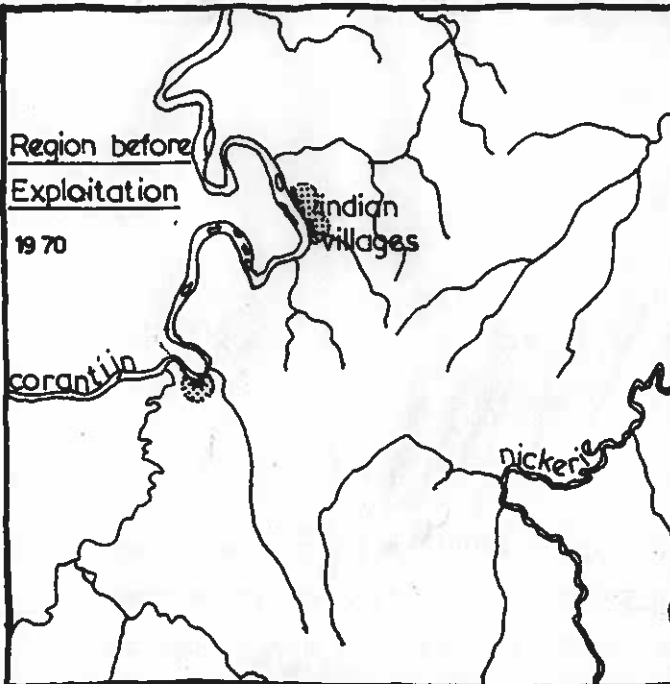
- 1) Equitable spread of population throughout all regions in Suriname is countered; primacy increased.
- 2) Existing expensive infrastructure (railway, houses at Apoera, service roads) in West-Suriname is completely abandoned. This loss affects the feasibility of Mr Sedney's proposal.

The regional plan presented in this report explicitly attempts to avoid the above disadvantages by describing new avenues for employing lower income/unemployed people in the rest of the country, therefore an alternative plan.

The existing plan-goal of self-reliance so often stated in 'Mobilization of the Own'(1975) finds its physical translation in one mining town at Apoera which houses highly paid mining employees and leaves little scope for other income groups in Suriname.

Testing criteria Plan/ Idea	Investments/Risk	Who Benefits ?	Effect
Existing plans (F. Essed)	93% in mining sector risks are concentrated and increased Agriculture ignored therefore agriculture stagnates	Miners, Billiton, M-K (railway construction) American timber(sleepers) Suralco (Alcoa)	Enclave company town (Apoera), Indians ignored, small employment increase, profit priorities = social neglect.
Mr Sedney	As above. Investments in railway are total loss	As above + suppliers/construction of new infrastructure to and at Paramam	Enclave at Paramam electricity and effort in Paramaribo increases primacy, decreases spatial equity.
I.S.P. West-Suriname	All sectors receive attention. A city + 2 towns is expensive/ large scale = large risks	Wider range than above, but urbanites and townites get most opportunities.	Spread urbanization ignores smaller settlements; consequently small, poor farmers.
PALU	Re-investment in exhausted backward regions is risky	Small rural population in existing regions, slum dwellers in Paramaribo	No increase in spatial spread. Uncolonised regions (West-Suriname + inland) lie dormant indefinitely.
Present Regional Plan	Risks are kept small by diverting investments to small scale activities/utilizing existing railway infrastructure to the full.	Mainly unemployed/unskilled out of work farmers, foresters. Majority groups with minority power.	Attempt at spatial equity, limited environmental impact and social mobilization to self improvement

Tabel comparing plans/ideas for the Region.



Internal Substantive Evaluation. PROCESSConsistency

When the problem brief and (subjective) views on regional development/planning in the Third World had been postulated, goals and ultimately objectives were described which would steer planning action in a direction thought to solve problems in the problem brief.

These goals and objectives were useful in eliminating unfavourable alternatives, giving firmer more detailed direction to proposals taken up in the regional plan, as well as operationalising the planning action. How consistent were the goals and objectives with the substantive proposals in the regional plan? A retrospective evaluation is critical to establish consistency in planning and make the necessary adjustments to the plan should any inconsistency be discovered. It should be noted that this kind of testing may occur intuitively whilst planning is in progress - the planner does not behave like a slow computer which cannot proceed to a next step before the present problem is solved. The planning process is cyclic - many problems at different aggregation levels may be considered, reconsidered almost simultaneously, and this may occur repeatedly in the planning process without the planner being aware of it.

Testing Goals, Constraints, Objectives

In review it may be stated that the goals have been carefully followed and translated into proposals in the regional plan. National spatial equity, optimum use of existing infrastructure and protection of rain forest have all found a place in the spatial pattern as proposed. The elimination of existing social problems is sought for by giving more participative power to the poorer classes, in small village/commune units thereby encouraging self determination, fulfilling basic needs and the quality of life are the mutual responsibility of state and regional citizen. Being capital extensive, proposed development discourages large financial mergers with multi-nationals, and by being production-intensive of basic goods, import substitution of these (presently imported) goods is achieved.

As far as the constraints are concerned the proposed regional development offers an (albeit experimental) tool to the lessening of dependence on foreign countries, lessening of primacy, increase in small forest-related industry and stimulus to co-operatives/communes. Small scale activities are not competing with large scale mining, but acting as a counter-weight/support to it, so that symbiosis rather than mutual exclusion occurs.

As with the constraints, objectives are also consistent with the substantive regional plan proposals. Minimum distances between settlements were adhered to to minimize travelling times and consequently travelling cost. Cheaper modes are generally usable only on shorter distances (walk, cycle, motor-cycle) and their use is encouraged in the regional plan. Alienation from work is countered by introducing activities/technology on a small scale.

The testing phase during the implementation of the plan functions as a much-needed feasibility check and corresponds with the objective of studying the feasibility of all projects.

The workings of a regional organizational body as defined in the managerial objectives, has been described at length in the proposed regional plan - the efficient working thereof being open to innovation, suggestion and experience (test phase has to monitor the working of this structure as well as all others proposed in the plan).

Restrictions to Plan Proposals

When evaluating the plan proposals in retrospect various restrictions to decision making were constantly present. These restrictions included uncertainties when making decisions, lack of empirically determined findings and lack of extensive economic input which in turn meant that the implementation of the plan proposals had to be restricted by a testing period.

In the light of such restrictions, the reader is advised to take proposals presented here with a pinch of salt. If an impression has been given of quasi-rational/scientific based decisions (for example the quoting of authors, who may themselves be making assumptions, to support a conclusion) this has not been the intention of the work process and proposals. What has been attempted is to present the decision making process in its entirety, including uncertainties featuring in it, to the reader with the purpose of enabling him to participate in the line of thought. This line of thought may at best be seen as an open-ended planning process, and not as the be all and end all of development for West-Suriname.

Other plans/ideas for the development of the region have been described and visualized in full to deter partiality from creeping into proposals; partiality being in itself a restriction to clear, rational decisions and proposals.

8.2 Procedural Evaluation - Planning Process

Personal Position as Regional Planner

The author is in a position where, just as with the I.S.P. West-Suriname in which he was a participant, he may determine his own tasks - he does not have a client (e.g. Government of Suriname) to which he is responsible. This gives him relatively unlimited leeway in his approach to the planning problem, even to the extent of determining the scope and nature of the planning task. Hopefully this "freedom of action" has led to new ideas in the future of West-Suriname.

Aggregation Level of Planning Task

As regional planning has been the main concern of this thesis, a limitation to the proposals is that they are at regional (and sub-regional) level only, and not at national level; though it is realised that regional development has direct effects on the nation as a whole.

No prior analysis was done to evaluate which regions in Suriname are best suited for specific development strategies. The outcome of such analysis affects the feasible allocation of diverse development projects to diverse regions - each to their own resource potential/capacity. Being aware of this limitation to feasibility of developments proposed in the regional plan, it was at all times attempted to avoid inter-regional pitfalls by minimising and stringently selecting those developments which have greater, or just as great feasibility relative to the rest of Suriname. An example is oil palm: this crop may be cultivated both in West-Suriname and Victoria with equal ease, but because Victoria is much closer to Paramaribo it has lower transport costs and exploitation is therefore cheaper than in West-Suriname. As a result oil palm cultivation has been given no priority whatsoever in West-Suriname in the regional plan, on the contrary this development has been set aside for the far distant future. Illogical exploitation of crops in West-Suriname, where this may occur with greater ease/benefit to existing inhabitants in other regions, has been consciously avoided as far as possible.

The Need for Regional Planning in Suriname and West-Suriname

The question could be asked: 'Does regional planning of development in Suriname and West-Suriname have any value?' If this planning leads to greater co-ordination between regional projects, less social polarization within regions, more employment opportunities for the nation's unemployed and prevention of random destruction of precious vegetation and landscape the answer is an obvious loud YES. However, the kind of regional planning where prettily worded goals bear no resemblance to eventual plans/activities is valueless, the more so because hopes which were fostered are dashed when promises are not kept.

Choice/Use of Planning Methods

Planning methods were chosen with a view to the nature of the planning task and available information. They were used as aids to

- rational clear decision making
- testing decisions and proposals, be it by the planner himself or readers of the report. By describing the how, why and wherefore of the planning process in full, it is hoped that those reading the report can participate in, acknowledge/criticise decisions, conclusions and proposals arrived at in the regional plan.
- structuring both subjective and objective viewpoints, opinions and desires on the direction that development in Third World frontier regions should take.

As far as the choice of planning methods used is concerned, the most methods applied were not selected anew, but taken over from the ISP West-Suriname and either tackled from scratch (e.g. the analysis of a regional development model) or only the findings used (e.g. in the case of the Potential Surface and Threshold Analysis, or the study of service package per settlement).

By re-doing the development model analysis with new up-dated in-put it was hoped to improve on the previous ISP analysis (Stereotypen Onderzoek), and by testing the findings of the Potential Surface Analysis it became possible to verify and subsequently use these findings.

The development model approach has as main planning advantage, the fact that it is not spatially bound or limited. In this way it becomes possible to re-use aspects of this analysis for corresponding regions in the Third World, with the proviso that no two regions are alike in every detail - a factor which must be allowed for when attempting to transpose/re-use the analysis for similar under-developed, natural, frontier regions.

The Strategic Choice Process as Used for Regional Planning

As indicated at the outset of this report, only the broad line of the strategic choice process was used to structure the present work process.

Aspects of AIDA and management of uncertainties which are not found in other planning processes e.g. that of Lichfield (1975) were found to be useful in structuring and refining the decision making process.

For example four main decision areas were abstracted which were used for the testing of impacts, and these decision areas made uncertainties clearer (manageable) especially when impacts of like decision areas were compared/confronted. The management of uncertainties was found to be a useful planning aid, as it formed a constant reminder that decisions based on top-heavy uncertainties were not good enough, and further studies/information (UE, UV, UR) would be required. In this way it became a kind of guillotine/- if the necessary certainty was lacking one would know that the decision would be in for the chop.

When evaluating AIDA and the management of uncertainties comparatively, it is concluded that the management of uncertainties emerged as a more useful planning tool because of the exacting demands it makes on decision making in the course of the planning process.

Participation in the Planning Process

In the Third World participation in the planning process is important at all decision making stages, as it is all too easy to ignore the needs of social groups without the opportunity/ability to make themselves heard. Although I did not personally interview local Indian inhabitants in West-Suriname, I had recent interviews by Els Nicolas (X min Y Bulletin, 1978) and Bert de Groot (ISP West-Suriname, 1978) at my disposal, in which their demands are plain to see. As a result the managerial plan concept proposes an on-going participation in regional affairs from the bottom-up.

Presentation of the Report

Clarity of presentation was strived for by closely following the outline of the work/planning process as well as dividing the entire planning process into eight main work phases, fully summarised at the outset, which provides signposts to guide the reader.

Although I would have liked to present certain aspects in greater depth, limits of time, money and manpower militated against this and the study concerned itself with broader, rather than narrow, in-depth analysis.

Conclusion

In conclusion the work process was characterised by frequent input from my mentors, as well as discussions and interviews which had bearing on specific aspects. This input served to structure both procedural and substantive aspects of my regional planning process. Participation in the I.S.P. West-Suriname provided a firm foundation from which I could build further. Without this inter-disciplinary input as background my study would in fact not have taken place, let alone be of any value, as I believe regional planning is essentially an inter-disciplinary, face to face and constant participative process.

Glossary of Terms

Alternative: An additional possibility of action proposed in place of another (existing) possibility, thereby enabling choice between the two courses of action.

Analysis: Examination and clarification of concepts/knowledge pertaining to a subject of study.

Basic Needs: Human wants and requirements essential to life, such as water, food, warmth, and health.

Bauxite: A hydroxide of alumina; one of the chief sources of aluminium.

Bazaar Economy: A system of reciprocal favours oriented to short term individual gain using mutual (family) assistance. It forms the urban social system of the Third World poor.

Centrum/Periphery: Centrum: Place of concentration/attraction of diverse activity, finance and culture e.g. industrialised countries in Europe.

Periphery: The external boundary or dispersed distant surface to the centrum.

Comprehensive Planning: Striving towards equilibrium in development transformation through co-ordination of policies by a single intelligence - Friedmann (1971).

Decision Area: A conceptual space in which judgements, effects and conclusions may be analysed and described.

Ecology: Relationships of a-biotic/biotic organisms with their external environment/conditions.

Growth Pole: The total of economic elements concentrated in one geographic space between which specific economic linkages occur which (could possibly) promote economic growth.

A Plan: is a scheme of arrangement and a description of a desired way of proceeding which is made before taking action.

Polarization: Extremities of axis or sphere, extreme opposites.

Primate City: The largest, best developed and most important city in an (under-developed) country.

Proto-Proletariat: The social class of people working in a bazaar economy being neither proletarian or peasant. They do not earn a regular salary and are engaged in individual or family enterprises such as selling shoes, vending, push cart wares, market goods and beer brewing - McGee (1974).

Rural Area: An area in which population densities are low and where agriculture, forestry or fishing predominates - Stockholm Conference (1972).

Self-reliance: Using only one's own (natural) resources, ability (labour, money) or judgement.

Spatial: Extension, distance or area viewed with reference to the objects/characteristics within it.

Social: Relating to persons as living in a society or to the public as an aggregate body.

Economic: Pertaining to financial matters and wealth, being the practical adjustment or administration of resources/financial activity.

Managerial: Administration and control of public undertakings/society/systems.

The Third World: Underdeveloped countries of Asia, Africa and Latin America, usually not aligned with either Western or Communist Nations.

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