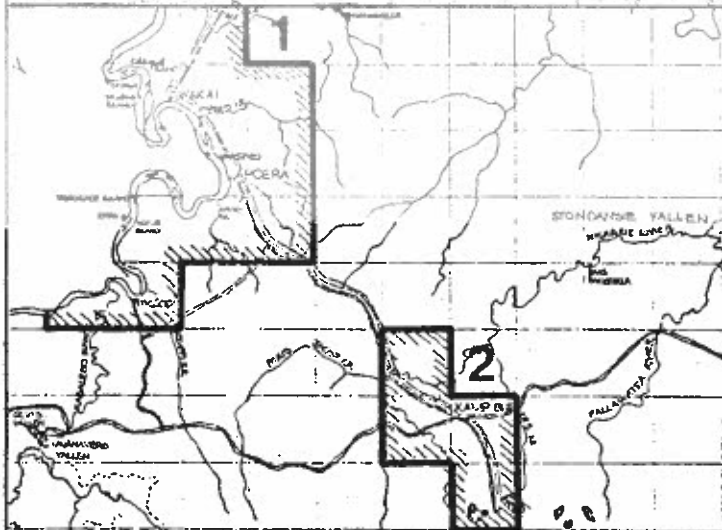
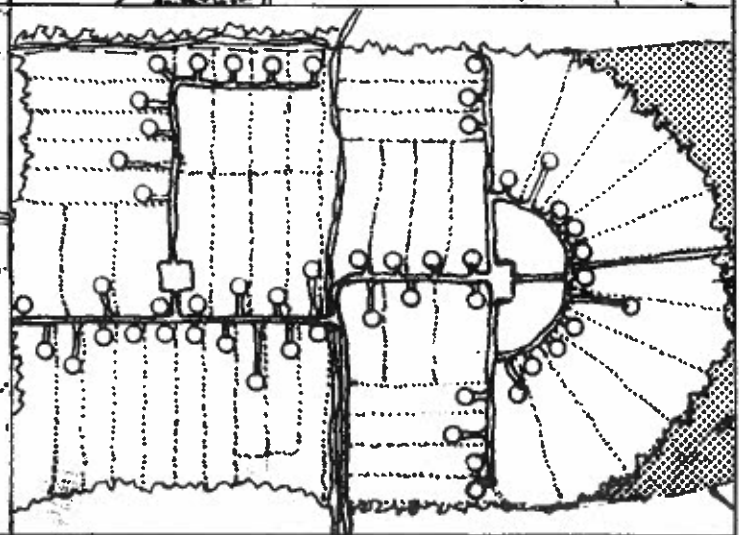
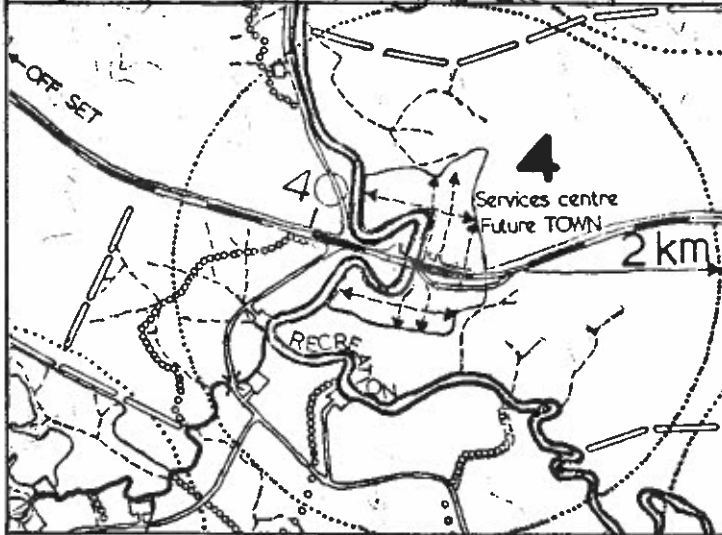
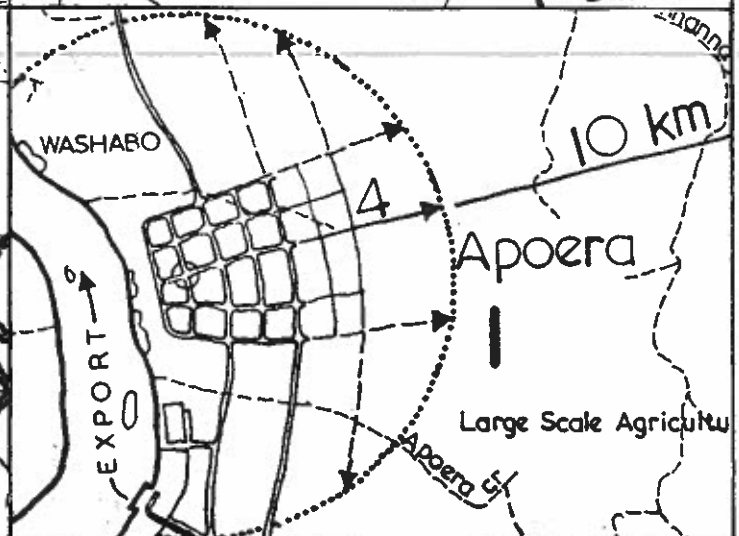
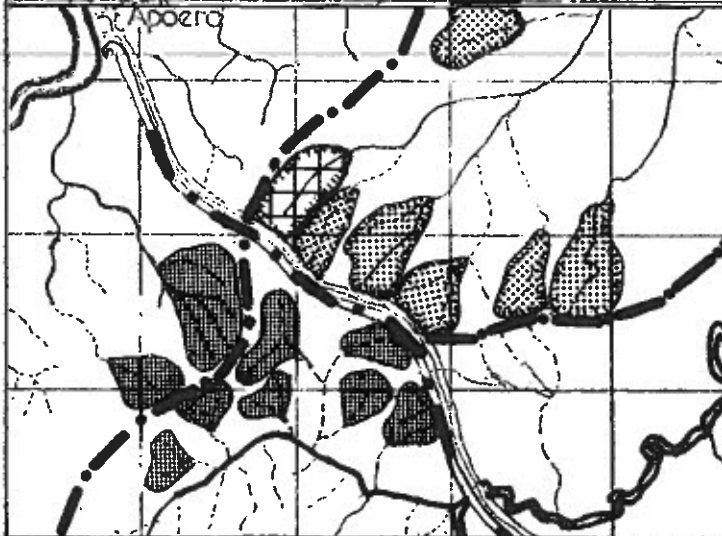


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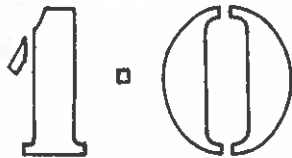


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CONTENTS - APPENDIX REPORT

<u>no.</u>	<u>Page</u>
1. Introduction - Purpose of Appendix Report	1
2.1 General Regional Development Theory	2
2.2 Specific Regional Development Theory	19
3. Regional Planning	34
4. Communes	39
4.1 The Kibbutz	39
4.2 Ujamaa	48
4.3 Other Models/Ideas	51
5. Miscellaneous	57
6. Regional Plan Study 1,2 and 3	68
7. Bibliography	80



Introduction

The purpose of this Appendix Report is three fold:

1) To serve as Appendix to the Regional Plan Report, West-Suriname.

In this function the Appendix Report hopefully provides further explanation and enlightenment on topic/authors briefly mentioned in the main report.

2) To serve as a Reader on 'Regional Planning in Underpopulated, Tropical Frontier Regions in the Third World'.

In this capacity the 'Reader' may be considered to be somewhat on the short side, but this was done intentionally to penetrate to the heart of the matter and maintain the thread as far as possible.

3) Lastly to rationalise and justify viewpoints, goals and decisions made in the course of the planning process.

An answer to the question, "Why communes?" and others like it is hopefully found in the following Appendix Report. In rationalization/justification of the regional plan as (spatially) proposed in the Main Report, two alternative plan studies completed in the cyclical process of plan generation are included in Chapter 6.

2.1 GENERAL

REGIONAL

DEVELOP-

MENT THEORY

Hilhorst, J.G.M., (1971), Regional Planning, - a Systems Approach
Rotterdam University Press

- 1) "Regional growth results from a set of decisions made inside and outside the region, leading to interregional trade. The results thereof for self-sustained growth depend upon the ability of the region to diversify its economic structure and to minimise the polarisation effects exerted by the primate region. The exports sector will determine the region's infrastructure during the first phases of regional development.
- 2) Regional growth is speeded up by specialisation and the creation of economies of scale, leading to a certain spatial structure of centres.
- 3) Administrative forces and a desire by producers/consumers to minimize transport costs leads to a certain hierarchy within the structure of centres.
- 4) The process of regional development finds its culmination in a situation where spatially distributed and specialised activities are internally integrated and form an integral part of the larger whole (e.g. nation).
- 5) A region may not develop or slump back because:
 - natural resources are exhausted
 - a structural change in demand has occurred
 - the socio-political structure is deficient (no labourers, no subsidies, no housing and education, i.e. no organization and planning).

The ways leading to the economic growth of a region are limited. They include:³

- (1) the discovery and capture of new markets for old products;
- (2) the introduction of new ways to produce old products (that is, changes in the production function giving more output per unit of labor and capital input);
- (3) the production of new or improved products and services;
- (4) the establishment of new types of organizations for production (for example, cooperatives, corporations, associations or firms);
- (5) the buildup of local physical infrastructure directly relevant for production activities (for example, roads, supply of electric energy, port facilities);
- (6) the creation of local savings and investment institutions;
- (7) the development of human resources: labor supply and its skills;
- (8) the development of local natural resources and improvement of locational advantage; and
- (9) the development of institutions and services to provide more or better information and knowledge useful in planning and production (for example, universities, research stations, telex, market research services, planning offices, mass media).

J. Friedmann (1973)

Some of these ways require the existence and ingenious use of individual entrepreneurial capacity in the sense of Joseph Schumpeter's classical model of risk-taking entrepreneurship. But their majority calls for cooperative, organized activity. Cooperation is needed, for example, to pull outside capital into the region for investments that will strategically advance the long-term interest in economic growth (for example, a new university, a tourist hotel, a shipyard, a research center). Organized action is also needed to mobilize local resources for special purposes or put existing capital to more efficient use (for example, a regional planning office, development-conscious regional and local authorities, improved management of natural resources, local institutions for investment credits to small- and medium-sized industries). Where concerted action fails to appear in sufficient volume, where it is misdirected, or where participation is restricted to only a small and self-serving elite of families, self-generated, sustained regional economic growth will fail to occur.

4

Recognising that the exploitation of a region's natural resources is often based upon investments originating from other regions, the resulting increase in the region's exports has multiplier effects similar to those occurring for a nation's exports.¹³ That is to say (although due to ownership of exploiting units by firms outside the region profits will often leave the area where they are earned and thus do not necessarily stimulate its further growth), the wages earned by the increase in export activities will be spent in the region, causing regional economic activity as well as imports to increase. Once demand for hitherto imported but potentially regional commodities has increased sufficiently to reach certain threshold values, it will become attractive for entrepreneurs to start production units within the region, thereby also enlarging the region's market for other activities. The creation of new industries will lead to the emergence of external economies and may eventually cause the arrival of new industries that add to the region's export base.¹⁴ In other words, the emergence of a 'national' or even 'international' economic activity, may (via the establishment of 'regional' and 'local' industry) lead to the diversification of the region's exports. And also, unless extra-regional demand is added to that from the region, the region's resources will not become fully employed. In this connection, it is quite possible that goods – such as wine, or wheat or sugar or wood – pass from being regional goods to the status of national goods.

Horst SIEBERT¹⁵ criticises the export base theory for neglecting the effects of intra-regional demand upon a region's output (it only looks at exports), but especially for not explaining the reasons for an increase in extra-regional demand. The increase in total demand – he maintains – should have to be explained from the factors underlying the regional growth process, as extra-regional demand originates from another or other regions. In other words, SIEBERT feels that the export base theory loses much of its attractiveness once it has to explain growth in a system of regions. His criticism concerning intra-regional demand is justified, it seems (no autonomous changes in non-basic activities are accepted, as a result, for instance, of response to higher income demand) while that concerning the causes of growth in extra-regional demand is not quite tenable once a number of aspects of a system of regions are taken into account.

There is – first of all – the fact that the regions of a country are virtually always at different levels of income per head, and, equally important, of different size. The cumulative flow of innovations in the more developed sub-systems will bring about new products, the raw materials for which are not necessarily available in these sub-systems. (In this way, SIEBERT's first objection is also met). These raw materials may be available in other sub-systems, however, especially in larger countries. Thus, an increase in a region's export demand can be explained by the regional development process that goes on in other (more developed) regions. Another cause for an increase in demand for certain regional products that turn into national ones – such as touristic attractions, folkloric art, etc. – is found in their skillful promotion through national communication networks, the establishment of which is part of the development process.

A third possibility for extra-regional demand to emerge – although not implied in export-base theory – is that certain natural resources become exhausted in other parts of the system, so that existing demand is diverted. A similar effect may be attained by sudden price differentials caused by imports restrictions, devaluation, etc.

Export-base theory, in order to work will, must assume that the partners in regional trade have attained a degree of integration by which the mobility of labour and capital is not hampered. It is possible, however, that infra-structural conditions prevail that cause these flows to be negligible, so that OHLIN's¹⁶ pure theory of international trade can be applied to the situation. The effect of trading will be a tendency for specialisation in the less developed of the trading regions. This specialisation – in the more favourable cases accompanied by economies of scale – will make for an increase in productivity, by which additional resources become available for investment. In this way a process of development is set into motion.

Source: Hilhorst (1971)

3.1.1 Basically, two methods have been developed that are of use for the measurement of the sphere of influence of a pole. The one is concerned with the study of the forces of attraction between centres, the other with the analysis of flows. Below, these two methods will be discussed.

The first method is based upon the gravity model and has entered the social sciences on the path of analogous reasoning.² REILLY³ and later on STEWART⁴ argued that the force of attraction between two centres i and j is reciprocally proportional to the square of the distance separating the two centres:

$$F_{ij} = k \frac{P_i P_j}{d_{ij}^2} \quad (3.1)$$

In equation 3.1, F_{ij} is the force of attraction ('gravitational force'), d_{ij} is the distance between i and j while P_i and P_j are the masses of the two centres as represented by their populations; k is a constant, similar in nature to the g of Newtonian physics. Continuing along the same line of reasoning, STEWART develops the concept of 'demographic potential', which is analogous to 'gravitational potential'. The demographic potential at a point i caused by a mass at point j (${}_iV_j$) is defined as:

$${}_iV_j = k \frac{P_j}{d_{ij}} \quad (3.2)$$

Total demographic potential at place i – which will be surrounded by a number of places – is equal to the sum of the ${}_iV_j$ for $j=1$ to n , if there are n places:

$${}_iV = k \sum_{j=1}^n \frac{P_j}{d_{ij}} \quad (3.3)$$

Total potential can be determined not only for i , but also for each of the other $n - 1$ places.

A good many studies based on this model have been made. Among the most famous are those of HARRIS, for the USA⁵, but also other studies worth mentioning have been prepared. One of these is related to Argentina, and has as objective to determine the economic regions and regional poles of that country.⁶ As in most studies, the Argentine research group assumed that k is equal to unity. Also, as in most other studies, it argues that not 'banal' distance should be taken for d , but economic distance as given with the cost of transport between i and j .

In a study concerning the six provinces of North West Argentina, we used this method again. It is based upon the following assumptions: *i* $k=1$; *ii* for d it is more appropriate to take economic distance as determined by transport cost per ton/km; *iii* the average cost of an average ton/km for N.W. Argentina is equal to this average for the whole of Argentina as determined for the study just quoted; *iv* the power to which d is raised should equal unity; *v* for any town over 1,500 population included in the P_i , not only the town's population but also that of the area determined by an 8 km radius from the town should be taken into account and *vi* it is useful to distinguish five levels in the hierarchy of cities of the region: *a* the regional level; *b* the sub-regional level; *c* the zonal level; *d* the sub-zonal level and *e* the local level.

Source: J. Hilhorst (1971)

Rather, the government will attempt to attain the expansion of the region's decision-making space. It will then choose between strategies *ia* and *ii*a or apply a mixture of the two. It is likely to do so in case of the development of a newly discovered resource as well as in case no such opportunity exists.

In the former case, the location of new activity will of course to some extent be determined by the location of the resource. If found close to a secondary centre, this might be the natural place to process and further industrialise the resource, while it will of course also depend on the location of the market how far this industrialising will go. But if economically feasible, most direct and indirect use of the new resource will be planned to take place in one or two of the secondary centres of the region that are closest to external markets. The requirement of location in a secondary centre is explained by the availability of infra-structural facilities, that have to be well developed or easily expandable in order to be able to accommodate the (often large size) industries related to resource development. The reason for preferring location close to the region's boundary is found in the objective of expansion. The spread-effects of the development in the secondary centre will be felt in all directions and, although there will be a tendency for these effects to be stronger in the direction of the centre, they will also occur in the opposite direction, in this way shifting the region's boundary outwards.

It may be necessary, however, to stimulate the emergence of these spread effects by constructing a new external transport route, and/or, especially if this were anyway a necessity for the development of the resource, to stimulate the location of productive investments in more than one cluster along this route. This policy is obviously one that would be more costly, but it may be desirable if the objective is dispersed expansion.

As said before, if no new opportunities for natural resource development present themselves, a type I region will tend to attempt further expansion. This objective will in general be least costly served by investments in secondary centres close to the region's boundary, but also strategy *ib* will serve the purpose. This is especially the case if rural development will profit from rural industrialisation.

It would mean drawing exceedingly on the reader's patience if we would advance from here treating each of the types of regional structure as we discussed the - fairly simple - case of type I. It seems more efficient to place the various relevant strategies in a table, and comment on each of them as seems necessary.

Source: Hillhorst (1971)

A first comment on Table 4.5 (see p. 102-103) concerns the occurrence of the entry 'Not Relevant'. It occurs especially in the columns 'Expansion' of Old Agricultural and Industrial Regions. That expansion is thought not to be a relevant strategy, follows from the consideration that regions which have seen their economy decay, will be in a position of 'defence' requiring a re-groupment of its forces rather than in one of attack. They will be first and foremost interested in establishing a new economic base or in renewing the existing one, that is to say, their objective is consolidation. The other three boxes marked 'Not Relevant' have been discussed above.

A second comment is related to the regularity in the appearance of strategy *ivc* and the regularity in the disappearance of strategy *ivb* from boxes in the columns headed 'Consolidation'. Obviously, this means that the strategy of consolidation - and especially of concentrated consolidation - can be followed by each of the three remaining types, even if they represent different spatial structures. This is indeed the case, but although such strategy amounts to basically the same, the surrounding tactics are somewhat different. That is to say, for types II and IV, strategy *ivc* is primarily intended to promote the emergence of a rank-size distribution of cities and should therefore be accompanied by decentralisation. In the case of type III, the latter kind of additional policy would not be required. This explains why in the case of type III strategy *ivb* (creation of a new centre) is not proposed as being relevant. Instead, we suggest that in cases of resource development and old industrial regions, major investments may have to take place in the region's centre, especially if the region's overall development is still at a relatively low level.

Strategy *ivb* for types II and IV is especially relevant for resource development and reconversion of old industrial regions. The creation of a new large pole - as we indicated in section 4.1 - may be much more effective in breaking away from the old ways and in promoting spread effects than trying to do so in the environment of the present centre. These psychological arguments will have to be supported by firm economic ones, however.

Our third comment points at the amazing regularity with which strategies *ia* and *ii*a occur in the first column. This means that the existing spatial structure does not greatly influence the choice of location of investments related to resource development, given the objective of expansion. This is explained by the reasoning given while discussing type I, adding again, however, that unless decentralisation is introduced in the cases of types II and IV, no effective results can be expected.

Table 4.5 Relevant Spatial Strategies in Terms of Location of Investment

Source: Hilhorst 1971

Type of Regional Structure according to section 2.4	Regional Problems of National Importance					
	Resource Development		Old Agricultural Region		Old Industrial Region	
	Expansion	Consolidation	Expansion	Consolidation	Expansion	Consolidation
	Basic Objective of Spatial Development		Basic Objective of Spatial Development		Basic Objective of Spatial Development	
I. Rank-size City Small Periphery Distribution	(1a) development corridor (1b) tertiary bound (11a) secondary centres close to region's boundary	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
II. Primate City-size Distribution Small Periphery	(1a) development corridor close to region's boundary (11a) secondary centres close to region's boundary (11b) centres along internal transport route (1Vb) new regional centres close to region's centre (1Vc) secondary centres close to region's centre	Not Relevant	(111a) tertiary centres close to regional centre (111b) centres along internal transport route (111c) secondary centres close to region's boundary (1Vc) secondary centres close to region's centre	Not Relevant	(111b) centres along internal transport route (111c) secondary centres close to region's boundary (1Vb) new regional centre (1Vc) secondary centres close to region's centre	
III. Rank-size City Distribution Large Periphery	(1a) development corridor close to region's boundary or regional centre (11a) secondary centres close to region's boundary or regional centre (11b) regional centre	(111b) centres along internal transport route (1V'a) regional centre or secondary centres close to region's centre	Not Relevant	(111a) tertiary centres close to regional centre (111b) centres along internal transport route (1Vc) secondary centres close to region's centre	Not Relevant	(111a) tertiary centres close to regional centre (111b) centres along internal transport route (1V'a) regional centre or secondary centres close to region's centre
IV. Primate City-size Distribution Large Periphery	(1a) development corridor close to region's boundary (11a) secondary centres close to region's boundary	(111b) centres along internal transport route (1Vb) new regional centre (1Vc) secondary centres close to region's centre	Not Relevant	(111a) tertiary centres close to regional centre (111b) centres along internal transport route (1Vc) secondary centres close to region's centre	Not Relevant	(111b) centres along internal transport route (1Vb) new regional centre (1Vc) secondary centres close to region's centre

Friedmann, J. (1973), Urbanization, Planning and National Development

".... the problem for developing countries is the simultaneous creation of the polis and the integration of almost everyone in it." K. Silvert, quoted by Friedmann.

Traditional society: When confronted by a system transforming demand, respond by disintegration or forming a new closed system.

Transitional society: Are overtaken by structural change and modernization demand but are incapable and/or without a will to deal with these new forces.

Modernizing societies: Have a will and capacity to integrate structural transformations into an ongoing system of interdependencies.

Crisis of inclusion: Government tries to control inflation, general unrest, disintegration of traditional authority structure.

7 Policy areas of urban-regional frame: a) Regional economic policy b) Migration and settlement policy c) urban development policy d) housing policy e) administrative and political development policy f) urban land policy g) social development policy.

These policy areas cut across sectors - they are facets, not global planning.

Agricultural objectives: "Urbanization of the countryside". Commercialization, mechanization and nationalization of agricultural production, co-operative farming, increased literacy, improved health care services, increased opportunities for the young.

Achieved by: appropriate programs in towns, draw scattered farming populations into villages. Migration policy can stimulate re-settlement through information, subsidies and action programs, urban land policy, control speculation, manage land in interests of community, devise methods for allocating land to families.

Advantages of urbanization: Greater openness in power-system, improve innovation probabilities, unlimited opportunities, unique urban culture, hastening of bargaining among competing interest groups; positive development. Reason for urbanization: Access to goods and services, potential information exchange; a means to economize on resources, save on physic development cost.

Small scale industry: "would fill in the interstices between the major enterprises, producing for small to medium-size local markets which are created in the course of growth". Richard Meier,

A new core region has:

- 1) Larger employment
 - 2) productive saving and capital formation
 - 3) experience and talent for further expansion
 - 4) increase innovative capacity.
- New works grow from old in core-region development.

A large city is the most rational location for enterprise because highest proportion of consumer income is concentrated; the attraction of social and cultural amenities, Threshold size of minimum efficiency of firms; face to face contact is necessary for the conduct of business. The future of the region is decided by the government, by central banking institutions, by central industries with a branch plant there. The optimal strategy is deliberate urbanization in only a few places, and not an even spread in rural land. By channeling a larger volume of investments into the region, urban growth may be promoted which would give the region its own centres of gravity, reduce primacy, encourage greater interdependencies among regions and break down the stark division between dominant core and dependent periphery, more productive agriculture close to pole.

"The creation of a 'climate for entrepreneurship' depends.... on the one hand on establishing social institutions which make possible the exercise of independent, individual enterprises, and on the other allowing the maturation and development of personalities whose predominant orientation is in the direction of productivity, working to creative integration."

Prof. Bert Hoselitz.

Urban immigrants maintain close links with their places of origin which encourages new social, cultural and political customs in rural areas.

- Criteria for territorial organization of power:
- 1) Effectiveness: autonomous, responsive, adaptive, innovative
 - 2) Political adequacy: consistent with political system, contribute to social mobilization.
 - 3) Efficiency: timely, accurate, economic.

Development of Tropical Lands

In review, without a model of the national economy little can be drawn from the cases studied that illuminates the theses on the expansion of subsistence farming or new growth poles. Aside from these two approaches the primary issues governing policy on the extension of the agricultural land frontier center on (1) the cautious pilot approach versus the big push, with or without balanced activities, to achieve a critical mass yielding external economies; (2) geographic dispersion versus concentration of effort; (3) the market prospects in combination with minimum income, employment, and income distribution requirements; (4) conservation versus depletion; (5) the source of capital and enterprise—i.e., public or private, foreign or domestic; and (6) the stage of development of the region selected to apply measures for expansion of new lands.

The view taken of these issues will be conditioned by whether the decision maker is a private investor, a government administrator, or a loan committee chairman from an international financing agency. Each will have differing and possibly conflicting objectives. It can be assumed that the private entrepreneur will be a profit-maximizer. Undoubtedly it will be a long time before the government decision maker enjoys the benefit of reliable parameters that prescribe national policy objectives—e.g., weighting factors on income distribution or social accounting prices for labor, foreign exchange, and capital. An international institution for development financing would be concerned with the borrower's capacity to repay the loan, obtaining leverage on wider policies than those directly affecting any given project, and the execution of the project in accordance with the loan agreement.

An important factor governing success in tropical land development is the source of capital and enterprise. The record shows that government-directed settlement has given poor results and has failed completely in a number of cases. In such projects no mechanism has been available to attract private capital and management ability in support of development. Further, the involvement of international financing agencies has introduced rigidities for monitoring purposes that have impaired the execution of what were already overly complex operations.

Failure has a high cost—little if any of the state expenditure in infrastructure, housing, land clearing, moving expenses, subsistence, or credit can be salvaged. A high degree of uncertainty is associated with tropical land expansion and settlement ventures and is compounded when responsibility is vested in weak institutions. Under these circumstances, attempts at complex “big push” or “balanced package” approaches almost inevitably will founder under the weight of market constraints, mismanagement, constantly changing personnel, and policy reversals. The less the state has interfered in the settlement process and the more it has concentrated on providing services demanded by the colonists, the better the result has been in economic and social terms. Given land reform objectives throughout Latin America and increased political instability, the investment climate for private capital must be judged as poor, especially considering ten-to-twenty-year pay-out periods on such ventures as plantations or settlement promotion.

There are many aspects of tropical agriculture and forestry that are subject to economies of scale. For example, plantation crops are generally more competitive in markets outside the local region if production is both vertically and horizontally integrated. Forest industry also may benefit from vertical integration. Successful sustained crop and livestock production require high levels of technology. The management skills needed to apply such technology frequently must be imported to the region at a high price and therefore are justified only for large enterprises. Further, the risks involved (weather, disease, price, input costs) in production for the market may be too great for the small farmer. Cooperatives are universally promoted to achieve these economies, but the performance record is dismal. An alternative is state enterprise. Again the bottleneck is management—few government agencies can provide the needed talent on a sustained basis.

Source: Nelson (1973)

Where there are real market constraints, as is the case for most tropical products, and where rural labor is underemployed, as it is in all tropical countries of Latin America, the use of scarce capital for mechanized forest clearing and farming makes neither economic nor social sense. On financial grounds, a capital-intensive operation for specialty export production may be readily justifiable. However, limitations on the market dictate that land and labor resources dedicated to such activities will be inconsequential. The prime importance of these resources will be as catalysts for associated small-scale, labor-intensive settlement and service employment, if the use of idle natural resources is seen as a means of making a major contribution to employment and consumption.

The planner is constantly striving to place decision making in the widest possible context. He argues that unless any given program, such as new-land development in the humid tropics, is viewed within both a continental and a national framework, there is no rational basis for setting objectives. At the national level the political motivation has been to secure territorial sovereignty through the geographic distribution of population and to allay pressures for agrarian reform in the guise of aid to landless campesinos through the mobilization of unused natural resources. Seen in these terms it is small wonder that deliberate government programs in tropical land settlement have lacked a development focus. Outside Brazil few of these efforts have made a significant contribution to economic growth.

This situation is changing. There is more concern with development, and all tropical countries of Latin America are firmly dedicated to the continued expansion of the jungle frontier. The international lending agencies possess certain attributes that qualify them to play a role in achieving a more systematic expansion onto new lands, especially when the development planners' goal is to introduce order and procedures for the evaluation of alternatives. These agencies bring to the scene a diverse and qualified technical capacity in natural resources, engineering, sociology, economics, and public administration. Their wide experience is reflected in realistic project design and implementation, and in a rigorous performance that can seldom be matched by governments wary of making unpopular decisions. When these lending agencies are involved in a project, they achieve a continuity that transcends the political instability of individual countries. Moreover their experience, long-range perspectives, and worldwide view of potentials and objectives lead to flexibility in program and project administration. In new-land development the initial responsibility of the international lending agencies is to assign financial and technical resources to assist countries in defining land development goals and in identifying the most appropriate areas for achieving these goals. The next step is to place land development programs within the context of Latin American trade; domestic markets for agricultural and forestry products; and plans for infrastructure and a mineral or forestry industry in the tropical interior.

Having set the stage for individual project financing, the first priority would be phased assistance for the consolidation of present spontaneous settlement. The second priority would be to establish a forest industry and to build feeder roads on the periphery of existing viable settlements in areas already opened up by trunk highways, or in regions having a potential for multiple resource (particularly mineral) exploitation

Source: Nelson (1973)

In spite of the evil reputation spontaneous settlement has acquired because of natural resource destruction and shifting subsistence agriculture, it offers the best chance of success in developing new lands where capital and administrative resources are scarce. The key element is highway access, preferably to areas on the periphery of an existing settlement where soil is reasonably good. The pioneer settlers who follow such roads will better match the development task than those who come as a result of elaborate promotional and selection procedures.

As settlers become established, the next step is phased and flexible state support for consolidation and expansion through deliberate programs in marketing, feeder roads, urban centers, forestry industry, agro-industry, and services. These efforts should be concentrated geographically rather than follow the usual practice of dispersion, with the aim of creating a major urban center and labor market in the region and giving impetus to the formation of a viable municipal government.

To these ends the establishment of medium or large corporate entities (private, public, or quasi-public) in both agriculture and industry is essential. Such enterprises will test and demonstrate new farming techniques, introduce needed management skills, provide employment and the basis for an expanding market for service and local agricultural production, and may mobilize private capital and entrepreneurial talent. The primary drawback to this type of development stems from the governments' inability (1) to identify areas that should not be used for agriculture, that should be reserved for forestry prior to agricultural development, or that should be reserved for other reasons; (2) to exercise effective control over land and forest use, even if these areas were identified; and (3) to strike a balance in the regulation of commercial enterprise.

This approach may be criticized as the application of an inadmissible social law of survival of the fittest. In addition it appears to condemn a generation of colonists to a life of deprivation. The idea that pioneer settlers need not be universally provided with credit and a full range of social services from the date of entry into new areas seems to reflect a complete disregard for social costs.

Source: Nelson (1973) Development of Tropical Lands.

Two complementary conceptual schemes provide a means of grasping the interrelations between urbanization, transportation improvement, and agricultural modernization. These are the neoclassical theory of rents and the industrial-urban hypothesis. In contrast to the common belief that farmers in developing countries are irrationally traditional, both paradigms view the farmer as responsive to price incentives.⁵

The neoclassical model of agricultural modernization can be presented with great precision mathematically, as has been done elsewhere.⁶ In essence, this paradigm views the farmer as a rational profit maximizer who chooses a mix of land, labor, and capital on the basis of their relative prices. Where land is relatively cheap, say near the pioneer fringe, applications of labor and capital per hectare are low and consequently yields are low. Conversely, near the market center or in especially fertile areas the valuable land is used more intensively, with heavier applications of labor and capital. As a result agriculture near the urban center obtains high crop yields and appears more modern.

The creation of a growth pole raises urban food demand, improves transportation to market, lowers the cost of diffusing modern technologies, and helps absorb a portion of the natural increase of the rural labor force. The effect of these changes on agricultural modernization and rural incomes depends upon the elasticity of the labor supply. For a frontier region like Goiás it is reasonable to assume that the supply of immigrants is highly responsive to small changes in wages. Consider now the effect of each change individually.

An increase in urban demand for food, due to increasing population or per capita income, raises food prices at the market center. As shown in the appendix, increased prices at the center translate into an upward shift in the rent-bid gradient in the entire region and hence an extension of the frontier. At any distance from the market the increase in prices received by farmers increases the value of the land and hence encourages its more intensive use (by greater use of fertilizer, improved seed, and insecticide, for example). Because each farmer now has somewhat more land to work with and because prices received at any

location are higher than before, farm wages rise. Consequently, the food supply increases as a result of both the extension of the frontier and the more intensive use of land within the pioneer fringe.

The effect of transportation improvements and innovations on farm wages depends upon the price-elasticity of demand for food. While this elasticity is generally less than unitary for the market as a whole, the demand facing a small region like Goiás is relatively elastic. This means that any increases in supply from Goiás can be absorbed with only a slight decline in the market price.

Within a small region improvements in transportation flatten the rent-bid gradient, encourage frontier expansion, and induce more intensive land use within the pioneer fringe. Yield-increasing or land-saving innovations, such as improved seed, better techniques of rotation, and mechanical weeders, result in a decreased demand for land and a retraction of the frontier. While such innovations may result in wage increases, labor-saving innovations such as mechanical harvesters and plows decrease the demand for labor. Were transportation improvements and agricultural innovations to occur in the entire food supply area of south central Brazil simultaneously, the increase in supply would lead to drastic decreases in prices and hence farm wages.

In light of these dynamic factors, what is the impact of industrialization-urbanization upon rural modernization and farm wages? Industrialization-urbanization encourages modernization, raises rural wages as the demand for food increases, and prevents further deterioration of these wages by the absorption of labor from the growing rural population. To the extent that industrialization-urbanization is responsible for the diffusion of a transportation network and agricultural innovations, it may lead to a deterioration in farm wages.

What have been the actual parameter shifts in south central Brazil in recent decades? Urban food demand has increased and the marketing system has improved, but technological progress has been slow. While an increase in demand tends to increase food prices, an improvement in the marketing system tends to lower them by bringing more land into cultivation and thereby increasing the food supply. The agricultural price index has remained stable relative to nonagricultural prices, so the shift in demand seems to have roughly offset an equivalent shift in supply.

The impact of these changes on agricultural wages depends upon whether the land supply has increased faster or slower than the farm labor supply. This is somewhat difficult to determine since published data refer to all land in farms, whether or not commercially exploitable, or to all crop land, which employs most but not all rural labor. In the period from 1940 to 1970 the ratio of farm labor to crop land decreased in São Paulo and Goiás and increased in Paraná and Mato Grosso. More significantly, there has been a decline in agricultural wages in these states during the 1950s and 1960s.⁷ In other words, industrialization-urbanization in south central Brazil has not resulted in development from the point of view of the mass of rural population.

While the neoclassical paradigm assumes that markets function perfectly, the industrial-urban hypothesis focuses on the evolution of market institutions. The hypothesis maintains the following propositions: economic development is normally uneven in space, development originates in industrial-urban centers, markets are more differentiated and more competitive in the more highly developed industrial-urban centers, and agricultural areas benefit from these markets in proportion to their proximity to industrial-urban centers. The markets of greatest relevance are for labor, capital, intermediate inputs, and agricultural commodities.⁸

Industrialization causes the demand for labor to grow faster than the supply in urban areas relative to rural areas, an effect magnified by the more rapid rural natural increase. This disproportionality between supply and demand raises urban wages relative to rural wages in the short run. Suppose that rural wages were initially invariant regionally. Potential migrants from rural areas will weigh the lifetime gain in earnings from rural-to-urban migration against its economic and psychic costs. The farther a rural area is from the urban opportunities, the higher the costs of migrating and acquiring information about these opportunities. Consequently, at equilibrium the disparity between urban and rural incomes will increase with distance from urban centers.

In addition, if industrial opportunities arise within a rural area, farm families located closer to the new urban center will be better able to avail themselves of them. Marginal farmers may

abandon farming altogether or may supplement their income with city work. Secondary farm workers, notably children and women, are more likely to work in the urban center on a part-time or off-season basis the lower their commuting costs. Since specialized educational facilities are likely to be located in the urban center, farm children within commuting range are more likely to take advantage of them. All of these channels draw labor out of the farm sector, raising its marginal productivity. Finally, low-income urban workers may be recruited for seasonal farm work, thereby lowering the cost of harvesting.⁹

The capital markets may function more perfectly closer to the industrial-urban core because large cities have more banks, which thereby suffer greater competition, and large cities attract more savings both because they are more competitive and because more savings are generated there. Because small loans are hard to obtain from beyond the local area due to information and transaction costs, farms in less industrial-urban areas face higher capital costs.

In the markets for intermediate inputs and farm commodities the more industrial-urban region tends to have better transportation infrastructure and marketing facilities for assembling and disposing of farm products, distributing agricultural inputs, and distributing goods and services consumed by farm families. Partly because of the better transportation system, the service area of the marketing firms is larger, permitting them to enjoy internal economies of scale. Moreover, the larger service areas can support larger numbers of marketing establishments, making them more competitive as well as more specialized than those existing in isolated small towns. The better marketing system in the industrial-urban region means that farmers receive higher prices for their products and pay lower prices for their intermediate inputs and consumer goods.

The predictions of the neoclassical and industrial-urban paradigms are generally similar. Closer to the industrial-urban center, land is more intensively used with greater applications of capital and intermediate inputs per hectare. Yields and labor productivity are correspondingly higher; rural populations are denser and more prosperous. It should be noted that the relationship between rural development and urbanization is reciprocal.

Fahrenkrog G., (1975), Ideas on Urban Growth in Under-Developed Countries
Oxford University Press.

There are three social-economic systems in Latin America:

- 1) The Plantage System: Import of slaves for agricultural export. Wide-spread population pattern by spreading plantations and many slaves.
- 2) The Hacienda System: Cattle, wheat. This is less labour intensive with population in small villages. Chronic underemployment;
- 3) Mining-Enclave economy: Mine and port dependent on metropolis and a relatively autonomous economic system. Population around a trading centre, not necessarily a port, which acts as power centre, and village system for agricultural production necessary for consumption and mining system with its own port. Examples are found in Chile, Peru, and Bolivia.

Behaviour of Multi-Nationals (spatially) in Latin America:

- 1) Enclave behaviour - no relation between multi-national production and regional economy. No dynamic forces are produced as spin-offs.
- 2) Highly technified production decreases employment and increases unemployment. A few highly skilled workers - a plant independent of labour market.
- 3) Administrative structure of multi-national in power centre, production plant where raw materials, transport and tax reduction are available. This behaviour increases power in metropolis as well as unemployment.

In North East Brazil and Chile, the attempts at diminishing the growth rate of the metropolis and creating new dynamic poles of growth have failed. What caused this was: a) Concentration of highly skilled workers (& highly paid) near plant b) this led to new social and economic strata with their own consumption patterns and spatial behaviour, in contrast to existing socio-economic formation. c) this caused migration from the rural hinterland due to labour and wage expectations, causing masses of under- and unemployed peasants in shanty towns.

Factors shaping urban and regional space:

- 1) investment decisions. 2) level of development of material productive forces e.g. transport. Improvement in transport modifies use value of space as well as circulation of persons, commodities and surplus. 3) The ideology, education and religion: affects the formal expression of space
- 4) Domination pattern of class structure.

In remote and undeveloped regions and in those which have experienced some economic growth based on a single crop or on mineral exploitation, the dominant groups – landholders, businessmen, political 'bosses' and officials of the central Government – have adjusted to the situation and derive advantages from it which they might lose if genuine development were to bring about a redistribution of power and income and an expansion and diversification of the opportunities for social mobility. In most cases, only these groups have effective ties with the national centres of economic and political power, and only they are in a position to engage in an exchange of benefits with those centres. They alone are in a position to monopolize any aid originating in the centres, and they can also frustrate the application of national policies designed to achieve decentralization and democratization of power.

The enumeration of these problems does not mean that the local power situation in Latin America is one that cannot be rectified or that nothing can be done about it for the time being. Local power structures are changing, as are the national power structures; and new forces are arising which are prepared to counteract centralism. Nevertheless, in view of the nature of the problem, it is essential to stress the need for genuine and organized popular participation, despite the many complications this participation may entail from the point of view of certain technocratic models for development planning at both the national and the regional levels.

An analysis of the characteristics and trends of regional development policies in Latin America shows that a new approach is emerging: the search for substantial transformations in the spatial structure of each country's development, with a view to reducing acute regional disparities, the organic incorporation of the human and economic resources of all the regions and the strategic management of socio-economic space. This approach seeks to halt the excessive concentration of national development around one or two super-regions, with its sequelae of accelerated and concentrated urbanization, growing and explosive socio-economic marginalization of broad sectors of the urban population, and stagnation of the rural areas and of the medium-sized and small cities. In this context, social factors acquire great significance.

The acute regional disparities in Latin America and their adverse social effects are not fortuitous. They are the logical outcome of the traditional pattern of development, characterized by its marked dependence upon foreign countries, its localization in coastal areas, its polarizing effect and its disintegrating impact on the internal regional structure. These features are characteristic of the great majority of the current social problems mentioned above and they strengthen the traditional pattern of underdevelopment. The social variables of regional development thus acquire even greater relevance.

Furthermore, the over-all development process – which is something more than the indiscriminate growth of the economy – is a profound and complex social process in which man and, his institutions, values and behaviour play the key role. At the same time, the development of the peripheral regions of Latin America involves much more than the establishment of industrial enclaves or the regular or occasional transfer of extra-regional resources: it is fundamentally a matter of releasing dynamic social forces at the local level in order to activate the key endogenous factors of development which will make it possible efficiently to utilize assistance from outside sources. This circumstance gives rise to a whole series of social variables which strategists and planners must deal with effectively, such as those relating to the demographic structures and human resources needed for development, the pattern of settlement, the conditions for development and community organization and the aggregate of values, attitudes and motivations of the population, as well as its way of dealing with geographical, climatological and health barriers.

The implementation of regional development policies and strategies 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. At the same time, it promotes the genuine economic, physical and political integration of all the regions into the main stream of national life. It also involves the development of the capacity for operation and initiative at the local level and the appropriate public and private administrations in political and administrative structure, require major transformations in political and administrative structures. This situation gives rise to serious social conflicts which must be taken into consideration when policies and strategies are formulated and put into effect.

The entire intricate process of social phenomena in development – which, at the national level, appears as an abstraction – becomes real and valid in a socio-economic space or in a locality, in other words, in the context of a community in a territorial unit or of a population associated with a geographical and economic space. Human beings need space to carry out their activities (see Hilhorst, 1970a). Most of the resources and processes of development, whether of local, national or foreign origin, exist within this context. Social, economic, historical, geographical and other variables converge or contrast within it and combine in complex social processes.

Whether it is considered an 'open system', a 'closed system' or a combination of the two, it is within this context that the following factors operate: man and his community and their complex universe of values, attitudes, motivations and capabilities; the linking of technology and natural and economic resources to produce goods and services; the processes of acquisition, distribution and redistribution of wealth and the mechanics of the market and of saving; and a great many of the social, cultural and political institutions, social relations and interaction of the various individual and collective interests. Here, too, man transforms and adapts geographical space and expands the boundaries of his economic space through the interchange of goods and services and by attracting or exporting human and economic resources.

There are several theories on the formulation and subsequent course of this local process which would, to a certain extent, explain the dynamics and mechanics of development at its early stages.⁷ History and social research provide constant and renewed versions of its path, past and present. In all of them it is easy to discern a central character: man and his community; a constant pattern: social change; and an underlying motivation the never-ending, sometimes conscious and sometimes unconscious, quest for new and better conditions and, above all, for opportunities for individual and collective fulfilment.

Dynamics of regional and local development

Generating and setting in motion local and regional dynamics – particularly in developing countries – therefore constitute an eminently social process. The objective is not so much to set up roles for investment and

7. See, for example, Marx (1956); Perroux (1962, 1958); Hirschman (1958); Myrdal (1962); Friedmann (1961–1962); Hilhorst (1970b, Chap. II).

high productivity, but rather to generate new social dynamics, to motivate and organize the regional community and to enable it to use its own resources and profit effectively from extra-regional forces. In this manner, development, whether initiated from outside or not, becomes steady and acquires its own drive; and the regional community grows stable and develops. Mere concentration of investments and installation of high-productivity machinery amounts, in practice, to the setting-up of a typical industrial enclave.

Such a situation produces two phenomena that militate against genuine regional development: a direct and vital link is established with the outside, permitting the enclave to exist and operate on the fringe of the local community and economy; and this isolation leads to an extra-regional drain on local production and incomes. These two phenomena, in practice, mean virtual marginalization of local society and a large part of its resources and an accentuated system of dependence and social stagnation. Added to this are the social problems arising from the attraction the new centre of economic activity has for the extra-regional population, and the frustrations and complications caused by the resulting urbanization.

If this problem is to be more clearly understood, various features must be taken into consideration. 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.⁸ For that reason, in formulating regional development strategies, Kuklinsky's suggestion (see Kuklinsky, 1970) of drawing a clear distinction between 'allocative' and 'innovative' planning policies, which have been well identified by Friedmann (1967), is particularly appropriate.

Accordingly, in the context of the developing countries of the world, and, in particular, of those of Latin America organizing and developing a region is rather more complex and challenging than simply setting up some isolated industries or a high-productivity industrial area to exploit a basic natural resource. This type of approach is necessary and doubtless plays an important part in industrial development within the national

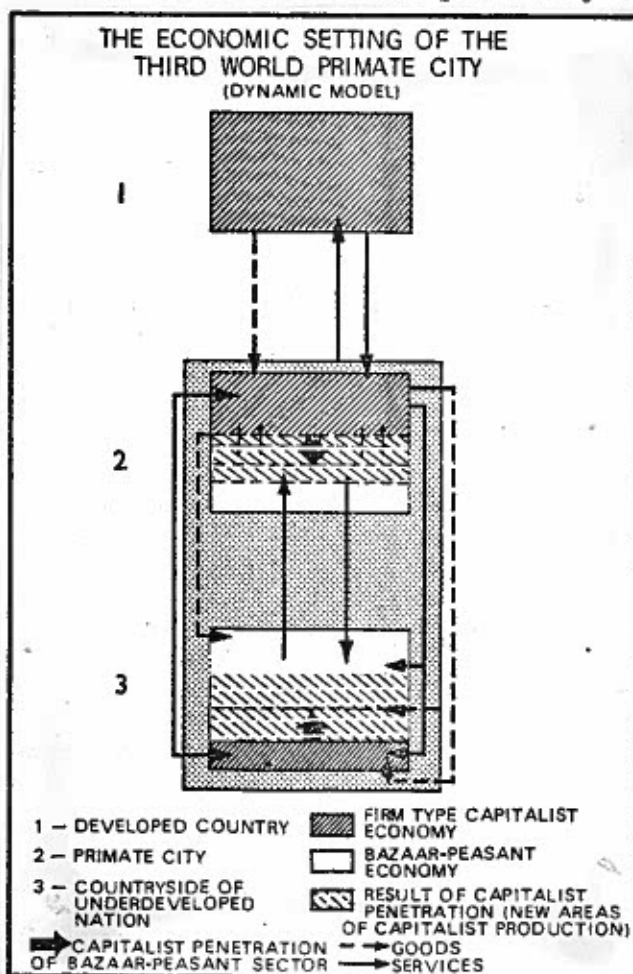
8. Obviously, both situations may occur in the same developed country, particularly in free-enterprise economies.

McGee T, (1971), Economic Structure of the Third World City

Service sector (tertiary sector) consists of two parts: a) Firm-centered economy: where trade and industry occur through a set of impersonally defined social institutions which organize a variety of specialized occupations with respect to productive or distributive ends. Capital-intensive limited employment. Labour seeks work. b) Bazaar-economy: The independent activities of a set of highly competitive commodity traders who relate to one another mainly by ad hoc acts of exchange. Labour intensive but end-product is a condition of 'shared poverty' (Wertheim). Underemployment where there are more people employed than is rationally necessary, is common in the Bazaar economy. Most absorptive. Regulatory mechanisms: 1) sliding prices 2) credit-relationship 3) fractionalizing risk-and profit-margin. These 3 mechanisms fractionalize trading activity allowing more traders into the system. 4 features of capacity to absorb increasing labour: a) tenacity of basic pattern, b) internal elaboration and ornateness c) technical hair-splitting d) unending virtuosity.

The family is the institutional base of the bazaar economy; bazaar economy relates strongly to peasant economy; and receives capital siphoned down from profits in the capital intensive sector.

The existence of many people in the service sector is positively correlated with urbanization.



2.2 SPECIFIC

REGIONAL

DEVELOP -

MENT THEORY

Source: Goodland and Irwin (1975)

Each house occupies a 20 x 80-m (or 25 x 125-m) yard providing space for a kitchen garden. The agricultural plots of each family are 100 ha in area and are planned to be within 5 km of the agrovila. Most plots have a narrow (500 m) frontage on the highway and are 2 000 m deep. By law, 50% of each plot is to be left uncut as forest.

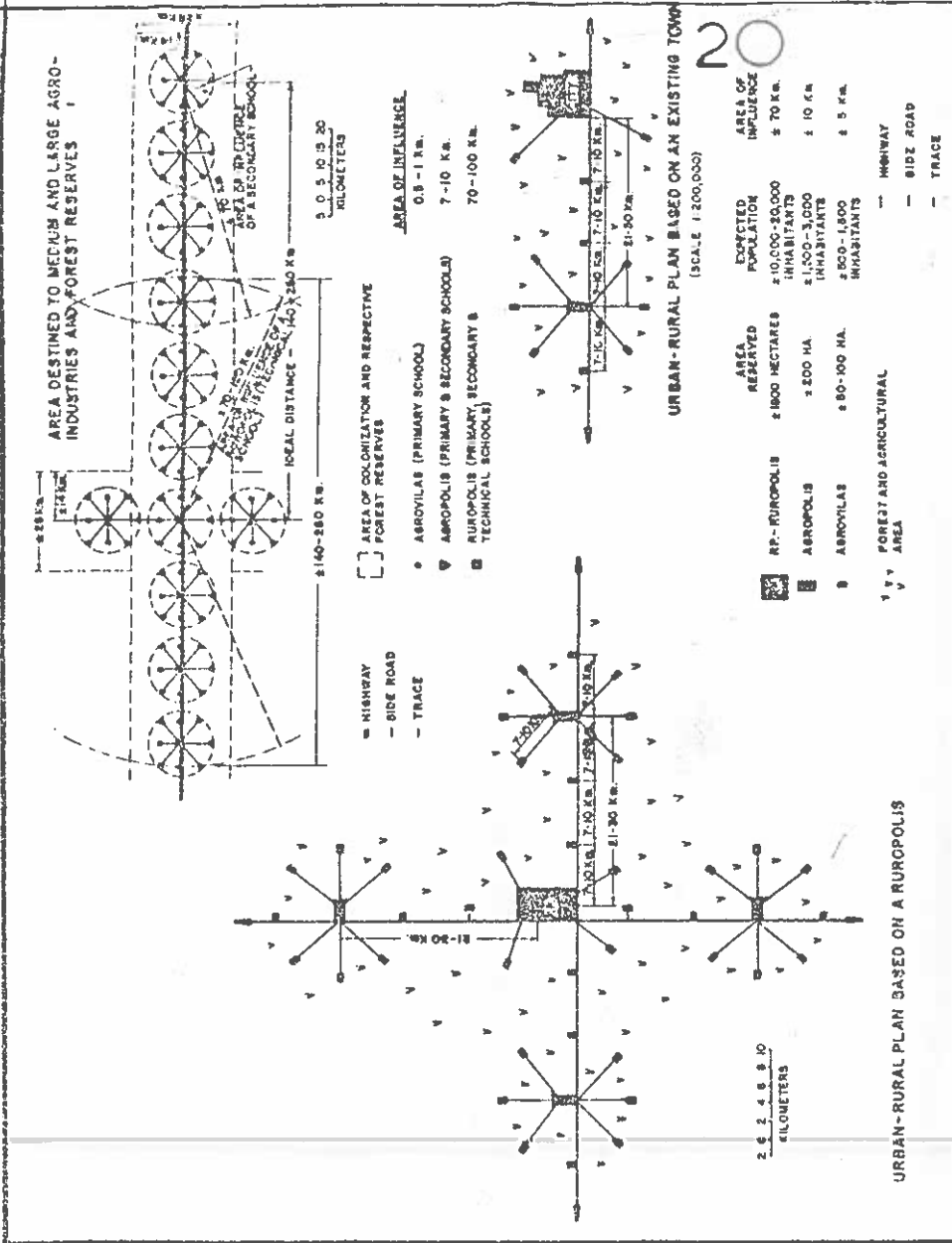
Every 50 km along the highway an agrópolis is built. These are agricultural towns serving four agrovilas. An agrópolis contains up to 500 houses, each on its own lot, the whole occupying a 300 ha site, of which 140 ha is not urbanized. These towns of up to 2 500 inhabitants are to have a high school within a reasonable bicycle ride from their satellite agrovilas. An 'olaria', that admirable Brazilian feature of tillery-pottery-cum-brickyard, will be built at each agrópolis, together with warehouses, silos, saw mills, rice mill, bakery, gas station and radio transmitter.

Basically, every 150 km a rurópolis will be established, each serving two agrópolis. The rurópolis is to be an agricultural development center serving a population of 50 000, and each is to have a vocational college. The first rurópolis is under construction at the intersection of the Transamazônica with BR165, the Cuiabá-Santarém highway. The projected relationship between agrovila, agrópolis and rurópolis is diagrammatically summarized in Fig. 3.

IN CRA provides the prospective colonist and his family with transport from his origin to the agrovila. The colonist technically buys the plot for a nominal sum payable at little or no interest over 23 years. Ideally, a simple house with basic utensils is prepared for the colonist, and 2 ha of his plot is cleared of forest by the government, which will finance more clearing later (O.D. Pereira, 1971). The house has piped drinking water and electricity accessible nearby and the colonist is given the national minimum wage during his first 6 months. Some basic hand tools, crop seeds, seedlings and rudimentary instruction are provided by IN CRA. Literacy programs, including night school, are available, as are basic medical and dental services.

The first stage of official agricultural colonization will involve 100 000 families, calculated at 500 000 people, three quarters of whom are Northeasterners. Unofficial or 'invading' colonists may, however, equal this number. Within the last 5 years, SUDAM, the Amazonian Development Superintendency, has approved 260 ranching programs involving 3.6 million cattle. The agricultural activities of this enormous and burgeoning force threaten to bring the most immediately detrimental impact of the entire Amazonian highway scheme.

In order to survive, the colonist must feed his family by his own produce. He may not succeed in the long term even in this task which is simple when compared to selling agricultural products and purchasing food with the proceeds. Hence practically all cleared plots are cultivated for manihot and rice, with some maize and beans. These crop species are all annuals, so necessary for the quick crops they provide but highly injurious to the ecosystem as they



Urban-rural plan for the colonization of pioneer highways (I.N.R.A.) (after José Geraldo da Cunha Camargo,

aggravate erosion and the loss of soil fertility while encouraging the predations of weeds and pests (Fig.4).

As the first agrovilas were fortunately sited on the largest of the very few patches of reasonably fertile soil in Amazonia, this warning is difficult to heed. The first harvest or two after clearing the forest are invariably the most productive and the encouraging average first year (1971-1972) yields per ha were: rice 1 600 kg (2 500 kg according to Rebelo, 1973), corn 1 300 kg, and beans 1 000 kg (F.A. Gomes, 1972). These two facts led to unbridled and perilously unwarranted optimism. The reality is that over 80% of Amazonian soils are officially and euphemistically classified as 'poor' (Falesi, 1974).

IN CRA is imposing the agricultural settlements on the landscape in a geometric grid as illustrated in Fig.3 (Da Cunha Camargo, 1973) with little regard either to physiography or to agricultural suitability. This scheme is environmentally and economically absurd and should be modified as soon as possible.

Source: E. Moscovitz in (Planning Urban Growth and Regional Development' ed. L. Rodwin (1969)

TABLE 20.3
Industrial and Agricultural Projects Compared

	Steel		Orchard		Small Dairy Farms		Large Dairy Farms	
	Mill	1	Plants	19	Farms	70,500	Farms	3,525
Number of factories and farms								
Project account	Million Dollars							
Investment	782	798 ^a	782	782	782	782	782	782
Sales	225	437	285	285	285	285	285	285
Gross value added	145	256	218	218	218	218	218	218
Net value added	109	218	202	202	202	202	202	202
Labor income	49	38	187	187	187	187	187	187
Savings								
profit and interest	50	171	5	5	5	5	5	5
depreciation	36	38	11 ^b	11 ^b	11 ^b	11 ^b	11 ^b	11 ^b
home payments	7	8	35	35	35	35	35	35
total savings	93	217	51	51	51	51	51	51
Current imports	26	9	—	—	—	—	—	—
Exports ^d	225	437	285	285	285	285	285	285
Net annual exports	199	428	285	285	285	285	285	285
Capital imports ^e	444	475	31	31	31	31	31	31
Employment	12,000	12,500	74,000	74,000	77,500	77,500	28,000	28,000
Investment per worker	65,000	64,000	10,600	10,600	10,100	10,100	28,000	28,000
Net value added per worker	9,100	17,500	2,700	2,700	2,500	2,500	5,200	5,200
Investment/sales	3.5	1.9	2.7	2.7	2.5	2.5	2.5	2.5
Investment/net value added	7.8	3.7	3.9	3.9	4.0	4.0	5.4	5.4
Investment/gross value added	5.4	3.1	3.6	3.6	3.3	3.3	3.7	3.7
Labor income per worker	4,100	3,000	2,500	2,500	2,200	2,200	4,400	4,400

Some people might be tempted to argue that additional investment in agriculture will increase productivity in agriculture and therefore reduce employment there. If output were not increased at the same time that additional investment was made, this would be correct. But we have limited our choice to autonomous industries precisely because we wish to avoid this problem. In both industry and agriculture we are discussing investment in *new projects* that will increase over-all output in the sector. Production methods on existing units will be unaffected by our decision. Thus the agricultural investment under consideration will clear new lands and build up new dairy herds, not buy tractors to replace hired hands on existing large plantations.

We are now ready to discuss the comparison that lies at the heart of this chapter. Suppose Venezuela had enough money to build another new steel mill and the necessary worker housing and training facilities—\$782 million. This money could be invested in 1 steel mill or almost 19 orchard-reduction plants, or in 70,500 small farms or 3,525 larger farms. Table 20.3 shows the employment, value added, and potential savings that would be generated by this sum in each of the various projects in which it could be invested. The comparison laid out here is neutral in the sense that it spells out only the consequences of different choices, the reader is free to choose between them on whatever grounds seem appropriate. (The next section discusses various criteria for choosing between projects.)

Contrary to the expectation of those who equate development with industrialization, the value added yielded by the agricultural projects is the same as or greater than that yielded by the industrial projects. While yielding a value added similar to that of the industrial projects, the small farms generate six times as much direct employment and four times as much labor income for the same investment. If agriculture is increased at the expense of industry, then, six jobs will be created in agriculture for each job lost in industry.

If demand for other products remained the same regardless of how our investment were used, we could say that our hypothetical investment would give us 60,000 more jobs if used in agriculture rather than in industry.

The two strategies are compared on this basis in table 2 using the lower level of value added in each case. The basic industry strategy is clearly quite successful in doing what it sets out to do: it increases by three-fourths the share of value added coming from basic industries, while virtually eliminating export industries and reducing by two-thirds the share of value added from industries depending on imports. Both strategies, however, show an imbalance in foreign exchange, since in either case manufacturing will depend on imported inputs that cannot be financed from manufactured exports.

An important dimension of this strategy choice that is not easily quantifiable is the demand made on managerial and technical manpower. The efficiency strategy, especially in its labor-intensive form, tends to emphasize simpler technologies, small plants and a fairly repetitive pattern of investment. Under these conditions it seems feasible to develop the required managerial and technical skills in sufficient quantity, especially if the first plants are used as training grounds for managers of later ones. However, since these industries must be efficient by world standards, the strategy cannot tolerate inefficiencies as managers and technicians learn by doing. Moreover, if small plants are part of the strategy, a more extensive government supporting organization must be developed, drawing more heavily on limited public management capability.

By contrast, the basic industry strategy emphasizes technologically complex plants, of which there would only be one to three of each kind constructed, which demand highly skilled technicians and managers. In the beginning, at least, these plants will probably have to depend on expatriate managers, which will reduce the impact of self-reliance for a time. However, the strategy also requires fewer managers and, because it turns away from world markets, can tolerate somewhat greater inefficiencies as Tanzanians learn to manage these industries. The contrast between the strategies can be illustrated best by the small-scale, multiplant cashew processing and sisal spinning industries, included in the efficiency strategy, and the steel mills and petroleum refinery, included in the basic industry strategy. But the contrast cannot be carried too far. Both strategies have many industries in common and both have considerable scope for varying the kind of managerial and technical demands by choosing alternative technologies.

The efficiency strategy begins immediately to exploit export and import-substitution possibilities, while the basic industry strategy begins by making large investments in heavy industries with longer gestation periods. However, by the end of 20 years the basic industry strategy does about as well as the efficiency strategy in producing net foreign exchange, largely because the two grow to look more alike over the longer period. Also, by its very nature the basic industry strategy implies more interdependence

Table 2
Source of value added

Strategy	Percent of value added at world prices from		
	Home industries using primarily		
	Exports	Imported inputs	Domestic raw mls.
Efficiency	18	29	53
Basic industry	1	10	89

among industries and hence demands better plan implementation performance. If the metal fabrication industry were developed too slowly, there would be an inadequate market for steel and that investment would have to be postponed; whereas in the efficiency strategy, a laggard metals industry just means slower growth, with less impact on other investment.

Limited choice

The strategic planning exercise in Tanzania indicate considerable scope for employment-creating choices in manufacturing, even under the constraint of actual planning situations. But the bulk of the employment problem remains to be solved by other sectors. There is considerably less scope shown for increasing manufacturing growth, but some room for saving capital in manufacturing while increasing employment. Considerable potential exists for dispersal and ruralization of industry by the adoption of small-scale technologies. These results should be applicable in broad outline to other low-income, medium-sized countries.

One striking result is that the choice between two conceptually very different strategies comes down in practice to a selection of only two or three major industries to include in one strategy and not the other. There is a large core of industries common to both strategies, an outcome that might not be predicted from the contrasting a priori specifications of each. Thus the practical realities of planning tend to reduce the area of conflict between opposing schools of industrialization strategy. This in turn implies that it will generally be easier to reach agreement on plans for industry if the planning work is done before decision makers are asked to select among competing criteria. Discussions about concrete choices among a few specific industries are likely to be easier to resolve than choices among abstract principles of strategy.

The increased planning effort, which may also yield substantial external benefits for subsequent planning, is more than compensated by the saving on scarce decision-making capacity.

Source: The Range of Strategic Choice in Tanzanian Industry by M. Roemer, et al. *Ekistics*, 1977

TOPOGRAPHY, NATURAL FEATURES

PLANNING/DESIGN/DEVELOPMENT CONSIDERATIONS. Every element of topography and other natural features of the environment should be considered as an opportunity to be used. Therefore, they should be analyzed/evaluated to permit the planning of the site to take full advantage of the positive features and to minimize the negative ones.

SLOPE data are recorded in locality/site plans, charts. Areas should be identified in terms of the slope ranges indicated in the table. **TOPOGRAPHY** data are recorded in aerial photographs, locality/site plans, photographs. Characteristics to be identified for each natural feature are: specific location and type (land surface undulation, water features, vegetation, geological formations); positive and negative conditions; influence (regarding physical aspects shown in table).

TOPOGRAPHY (*) -- the configuration of a [land] surface including its relief and the position of its natural and man-made features.

NATURAL FEATURES (*) -- prominent objects in or produced by nature.

The extent and character of such features—simple or complex undulations, water courses, near and distant views from different points of observation and individual or massed effect of trees—have varied relations to one another and to all developments that can be foreseen.

The topography of the site is a composite of its **NATURAL FEATURES**:

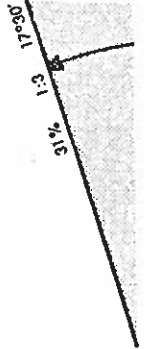
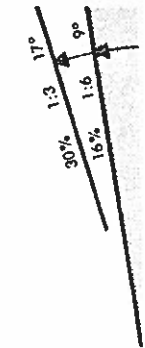
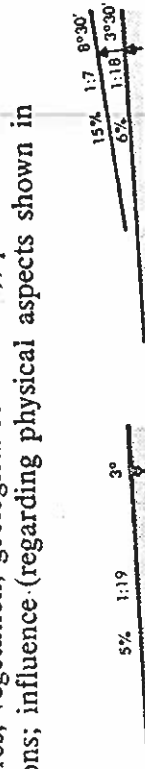
• **LAND SURFACE UNDULATIONS**: hills, valleys, slopes, flat land, etc.

• **WATER FEATURES**: streams, rivers, ponds, lakes, marshes, floodplains, etc.

• **VEGETATION**: trees, grasses, ground cover, etc.

• **GEOLOGICAL FORMATIONS**: rock outcroppings, ledges, boulders, etc.

The main indicator of topography is **SLOPE** or angle of inclination of the ground in relation to the horizontal plane. **SLOPE** can be measured in terms of Degrees, Ratios (1/cotangent of angle), Percentages (100 x tangent of angle) as shown in diagram. Topography (**SLOPE**) is a major planning/design determinant. It defines, particularly, the physical aspects shown in table.



LAND USE	No restrictions	10% and up not adequate for playing fields or other large outdoor flat areas because demands heavy grading	Parks or other areas that require little or no grading	Unusual conditions for land development will require careful study in all aspects
LAND SUBDIVISION	No restrictions in lot dimensions	No restrictions in lot dimensions	30% and up not adequate for small lots: will present foundation and retaining wall problems; multi-story structures will reduce costs per unit for foundations and land development.	
CIRCULATION (VEHICULAR)	Safe, sustained grade for all vehicles U.S.A.	9% to 12% steepest grades for highways U.S.A.	30% to 32% steepest grades for paved streets in U.S.A. Layouts will require roads parallel or diagonal to contour to reduce slope	Unusual conditions for land development will require careful study in all aspects
DRAINAGE SEWAGE	Flat land may present numerous problems in sewage and storm drainage that will raise improvement costs.	5% to 10% will facilitate sewage and storm drainage	20% and up will present problems in sewage and storm drainage that will raise improvement costs	
LAND DEVELOPMENT MAINTENANCE	Flat land may not be economical to develop	5% to 10% is more economical to develop than flat or steeper slopes; 10% and up may demand heavy grading, causing greater settlements, erosion	20% and up will increase sharply costs of land development and maintenance	Unusual conditions for land development will require careful study in all aspects
BUILDINGS	No restrictions	10% and up will require study of soil, building type, construction system, grading, foundations, number of floors		
SPEED -BUS/CAR -PEDESTRIAN	100-120 km/hour 4 km/hour	10% and up no good for sustained distances 9% - 2 km/hour; 10% and up no good for sustained distances		Unusual conditions for land development will require careful study in all aspects
SURFACE PROTECTION	Surface protection against erosion (rain, wind, intensive use) should be considered with SOIL characteristics			

TABLE OF SLOPE LIMITATIONS FROM 0% TO GREATER THAN 30%.

Source: Caminos & Goethert (1978)

The decline in crop yields

The inexorable decline in crop yields from cleared forest plots in Amazonia is well documented, although still not completely understood. The major causes of crop failure are outlined in the diagram of Fig. 5. There are four immediate causes: decline in soil fertility, relentless competition with weeds, rapid pest build-up, and an increasingly harsh microclimate.

When the forest canopy is rent, the decline in soil fertility begins and is accelerated commensurate with the decrease in the overall amount of transpiration. The less pure-water transpired by the vegetation means the more nutrient-bearing water is lost to streams. Subsequently, sunlight pouring to the hitherto protected forest floor rapidly dries and oxidizes the litter and humus, first speeding decomposition and killing the decay micro-organisms, but then ending the decay process. This reduces the return of nutrients from litter to roots. Rain percolating through the canopy leaches nutrients which may be the only supply to parts of the ecosystem: with forest cover removed and rain directly reaching the soil surface, this circuit is broken (vide Horwitz, 1974).

Burning has the effect of concentrating nutrients from foliage and wood and transforming the nutrients to a soluble state deposited in the form of ash on the surface of the soil. Two critical nutrients, nitrogen and sulfur, are rendered volatile by burning and so are lost. Along with nutrients in smoke or dust, nitrogen and sulfur are lost to the burning plot, although they will be used if they are deposited on land elsewhere. Most nutrients washing into rivers are irretrievably lost to the forest ecosystem.

The first burn releases most of the stored nutrients; subsequent burns add much less. Once the nutrients are absorbed by plants in the clearing, little residual fertility remains. The nutrients not taken up by plants are rapidly leached by the first rains. Any litter and humus have their last nutrients extracted by the rain. Thereafter they are exposed to the full force of the weather.

Deforestation and burning kill many animals, both directly and indirectly, by destroying their habitats. The disturbance of felling and burning combined with the continuing disruption of man's presence causes many fragile animals to disappear to more remote areas. Fire inevitably kills the rich fauna of the forest floor; the increase in light and harsh dryness is prejudicial to a wide array of forest animals. The role of animals in the cycling of nutrients and in the maintenance of fertility is an influential one, and particularly the invertebrates inhabiting litter and the upper layers of soil. This group of animals provides nutrients for the absorptive root mat and may retrieve nutrients descending into the soil. Although some termites, ants and worms remain active in cleared sites, most of the closed nutrient circuits are disrupted, thus contributing to the decline in soil fertility.

The major disastrous effect of disrupted faunal equilibrium is that some animal populations swell for lack of biological control. With predators killed or retreated, phytophagous insects increase rapidly, especially when provided with an attractive meal of tender crops. Plant-eating insects are always abundant in the various levels of forest canopy but they are kept in check by their predators, chiefly bats, birds, amphibians, reptiles, and entomophagous insects. With their larger predators excluded, the rapid breeding cycles common to most insect species spawn enormous numbers of individuals in short order.

Cultivated plants have been selected by man through the centuries to increase the proportion and palatability of the harvestable part, as for example the corn cob. The price exacted by breeding and selection seems to have been

a weakening in the natural chemical and mechanical defenses of the plant against the depredations of pathogens and insects. Wild plants are much less vulnerable to disease and insect attack and many, particularly tropical plants, are armed with chemical defenses. The energy and resources a wild plant spends in manufacturing chemical defense is channelled into localized food deposits in crop plants -- an ideal compromise from the insects' point of view. The situation can be summarized as one of an abundant and uniform food source of proven palatability, high fertility, and unmitigated vulnerability presented to the insects in an enemy-free zone!

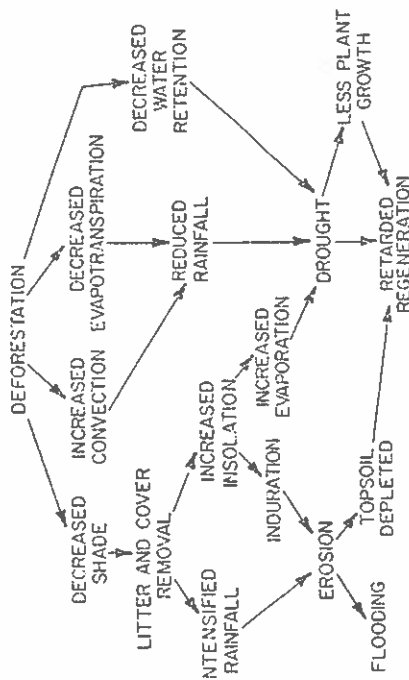
In many instances and certainly in due course, weeds hasten the decline of fertility and cause the plot to be abandoned even sooner. Weeds are plants highly evolved to exploit transient conditions. Their dispersal mechanisms are so efficient that their disseminules are at the site before clearing or arrive shortly after. Their rate of growth is often faster than that of the planted crop and their life cycle is much shorter. Weeds do not divert large amounts of energy and resources into manufacturing food stores as cultivated plants have been bred to do. Weeds specialize in precocious reproduction, liberating immense quantities of seeds early and fast. Nutritionally, many weeds are oligotrophic and can grow on soils of low fertility while offering less nutrition to phytophages. Other weeds are endowed with nutritional strategies such as nitrogen-fixation, mycorrhizal association and symbiosis, and so are less limited than crops by poor soils. Once established, many weeds reproduce vegetatively which renders them even more difficult to eradicate.

Weeds are specialized to prosper in harsh microclimates. Better than crop plants, weeds tolerate drought, wide temperature fluctuations, and high insulation as well as devastating wind and torrential rains, the last often assisting in dissemination. As tropical weed communities are commonly composed of many species, nutritional competition is reduced among individuals. Usually planted in monocultures or oligocultures, cultivated plants heighten competition with each other because they require the same nutrients, in the same proportions, at the same time and from the same zone in the soil. In addition to which, crops are eutrophic, having been bred to concentrate large quantities of nutrients in the harvestable part. In this light, it is not surprising that such crops fail to compete with weeds, and inevitably succumb when in competition with them.

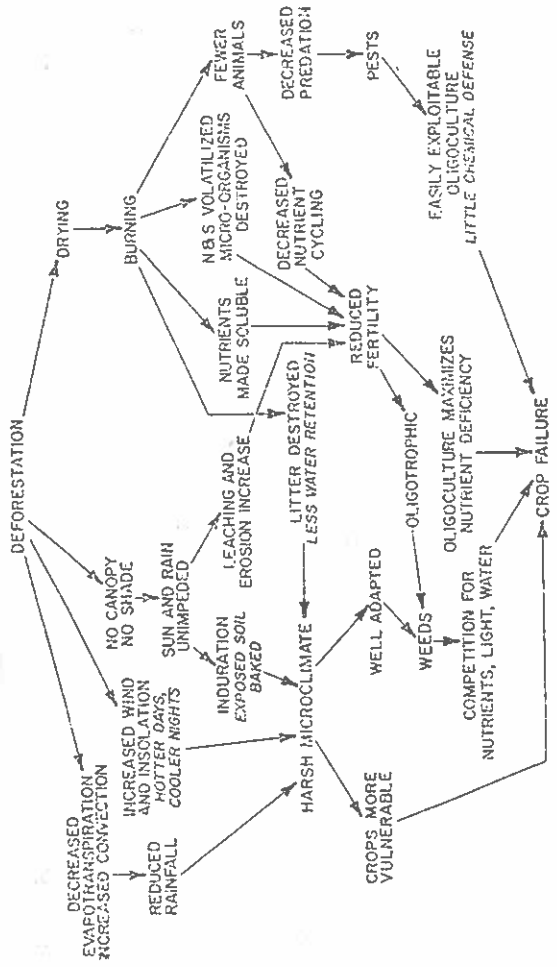
Cultivated plants have been bred to thrive in amenable climates, so that much of the farmer's labor is devoted to improving the microclimate. Soils are mulched and plowed, harrowed and watered and provided with whatever degree of shade is appropriate for the crop. Under such ideal conditions crop plants are able to grow better than weeds. However, in primitive agriculture, limited to the removal of shade and the provision of ash, crop plants are less successful. The removal of shade allows the sun to bake the tropical soils hard and dry. Cracking dries the soil even more deeply and exposes and breaks small roots. Crops lose water readily and suffer overheating in the full sunlight.

Source: Goodland and Irwin (1975)

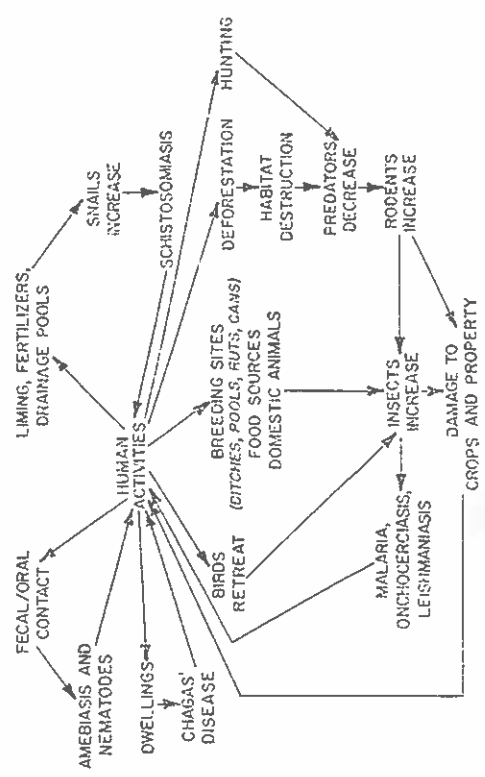
Source: Goodland and Irwin (1975)



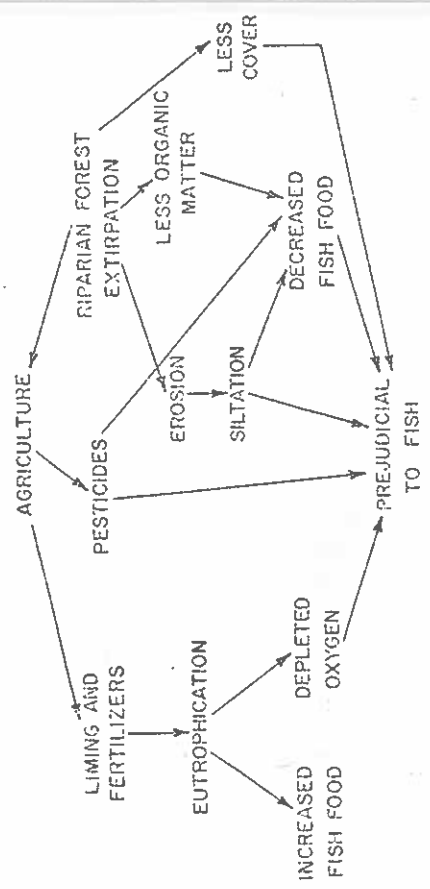
Environmental disruption caused by deforestation.



The relationship between deforestation and crop failure.



Environment and disease.



Forest disturbance and fish.

There is now little doubt that profitable annual crop production can occur in a forest clearing for only 2 or 3 years before decline in yield and invasion of pests and weeds make it easier to clear more forest. Although this system has served since man arrived thousands of years ago, it is an ecologically sound strategy only with low population densities. It is totally inadequate to support the huge numbers of officially sponsored colonists now taking up residence in Amazonia. Forest destruction, 'overgrazing by man', or the agricultural activity stimulated by the new Amazonian highways presages their most damaging environmental impact.

Alternatives to present trends

Amazonia has one of the lowest population densities in the world, largely because the region is unsuited to sustain a much greater population. The fact that the Amazonian forest has the highest net annual primary productivity is irrelevant to human settlement for, as has been pointed out, this datum bears no relation to the productivity of any agricultural substitution. The significance of productivity to humans is the value of the product less the cost of the sustainable exploitation necessary to obtain that product. So far, in the history of tropical agriculture, it is not interest but capital that has been sold; even then the value of most products is abysmally low (e.g. sugar, bananas) while the costs of production are intolerably high and spiralling ever higher. These costs include the often irreversible destruction of the forest ecosystem; the mining, laterization and erosion of the soil; the accelerating importation of machinery (including spares); introduction of pesticides and fertilizers; combustion of fuel; increased dependence on international economic whims; the marginalization of society and other societal ills.

While it is unfortunate that lowland tropical forest cannot sustain a large human population that is based on conventional agriculture, much less can the forest continue to supply the populations of temperate regions with cheap products. We are confident, however, that ways will be found for the rational and sustainable use of a largely forested Amazonia. We feel that judicious management is the effective approach to conservation.

At the present time the Amazon forest cannot be exploited on a sustained-yield basis compatible with environmental preservation. Techniques for sustainable-yield tropical forestry, silviculture or wet forest management compatible with a degree of environmental preservation may, in fact, be known in some quarters. Such techniques are applied with variable success in Queensland, Southeast Asia and Africa. These techniques depend to a great extent on detailed experience garnered through the years and on the effective control by a literate and skilled labor force, unrelinquished from generation to generation. It is possible that a large and well-trained team versed in such techniques

could apply them successfully in Amazonia (e.g. P. Gomes, 1949; Lechthaler, 1956 a; Sioli, 1970). Amazonia is being colonized largely by illiterate peasants who have meager experience of any agricultural management whatever. These people are from the semi-desert Northeast of Brazil where crops grow well in the irregular rains, and not at all in the intervening drought.

Nevertheless, the Amazon forests are being swiftly obliterated and the exposed land subjected to preposterous abuse for denisory short-term gains which will be rapidly supplanted by desperate, long-term problems. This is a frightening prospect, for all the colonists depend for their very existence on these 'short-term gains'. The resolution to this impasse is less environmental-ecological and more socio-political. As D.H. Janzen (personal communication, 1974) points out, it is not a lack of knowledge of conservation technology so much as it is the question whether people should be manipulated to where they will agree to do things that way. The alternatives that follow are the best we can suggest and will indisputably cause less damage than the present course.

Conservation

Until a rational use can be effectively applied in Amazonia, broadscale destruction should be stringently curtailed. Research judiciously planned and pursued by environmentalists, ecologists and sociologists should be encouraged and intensified to hasten the discovery and mode of application of managerial solutions. We realize this is an extreme standpoint, but we feel it justified in view of the irrevocable environmental destruction threatening from present trends of peasant agriculture and extensive cattle ranching.

Divert pressure from Amazonia

There is mounting pressure to exploit Amazonia; much of this pressure could easily and should be diverted to the contiguous cerrado region, which is spread over 1.5 million km². Partly due to distance from population centers, cerrado is still largely empty but is now easily accessible by means of the Belém-Brasília and other highways. Cerrado is endowed with more amenable agricultural conditions, particularly where limestone is available, than is Amazonia in general. Most cerrado is adequately watered for half the year and is blessed with an invaluable dry season during much of the other half. Conventional agriculture in the cerrado is even now at least as successful as in Amazonia and provokes infinitely less environmental damage. Technical assistance which employs the results of research already completed will increase the success of cerrado agriculture. Much less research is needed to guarantee the success of cerrado agriculture than is needed for an Amazonian solution. Cerrado agriculture need not wait for research results; Amazonia must.

Source: Goodland and Irwin (1975)

The following tabel indicates the size (area) and production of different farming types in a tropical region, e.g. West-Suriname.

Crop/livestock/dairy produce	Produce per hectare	Farm size	Production per farm in 1 000 kg
Rice	2,5	15-18 ha	40
Sub-soil crops (potato, carrot)	20	30 ha	600
Sugar	3	-	-
Fruit	20	30 ha	600
Vegetables	10	1 ha	10
Bananas	25	-	-
Citrus	17,5	6 ha	105
Beef and mutton	0,3	100 ha	30
Pork	-	20 female pigs 2 boars	7
Chicken run	-	5 000 broilers	24
Eggs	-	2 000 lay- chickens	22
Milk	4	15 ha	58

Source: Harteveldt for 'Prosur', 1977.

Any methods for sustainable agricultural exploitation for lowland wet tropical forest will vary with soil, climate, and site conditions as well as with product, labor and markets. Each case must be carefully studied beforehand and it will be found that much, if not most, of this ecosystem will not sustain heavy harvests using the methods known today, most of which have their genesis in temperate areas.

Agriculture can be sustained in certain lowland tropical areas only if four related precautions are respected. First, the closed nutrient cycle must be maintained. Nutrients must not be allowed to leach into the soil. Second, the forest canopy must not be perforated. Sunlight and exposure cause rapid deterioration of the forest floor. Third, the extent of nutrients imported into the ecosystem as rain solutes, dust, fixation by plants, and a little from the substrate should be used to determine the sustainable size of the crop to be harvested. The nutrient content of diverse species of common woodland trees is largely unknown (even in the U.S.A.), so there are many variables still to be ascertained. Selection of oligotrophic (lignin, fats, carbohydrates) over eutrophic (seeds, apical meristems) harvests should be reconciled with the disturbance necessary for the harvest (e.g. logging vs gathering vs tapping). Fourth, biotic diversity in physiognomic types, trophic levels, life forms, species composition and age distribution must be maintained above the level at which the activities of pests become a serious factor. Such diversity will reduce nutrient competition and avoid the depredations of pests.

The wealth of species of tropical forests is penalized in commerce, especially in North America and to a lesser degree elsewhere, by the incessant and banal demand for standardization and uniformity and the concomitant rejection of variety. This has caused a small number of species to be extirpated in accessible places. Rosewood (*Aniba rosaeodora*) for example, no longer occurs within 300 km of Manaus. The removal of a few widely scattered trees with no regard for seed sources or cultivation has led to widespread damage and much local extinction. Education of the buyer and improvement of harvesting techniques will help mitigate this type of environmental damage.

Although progress is being achieved toward rational forest use, time is short and solutions theoretically effective may be inapplicable. It is likely that a definitive answer to lowland tropical forest management may depend on knowledgeable and highly skilled foresters working at a low intensity. It may well be easier and more effective to train an Amerindian with complementary skills rather than attempt to teach forest ecology to a literate.

The gathering of flowers, nuts, fruits, seeds, loose bark and the tapping of resins, saps and latex need not disturb the forest. Tapping must not be allowed to kill the tree, and the customary methods of seed and fruit harvesting should ensure that sufficient disseminules for reproduction are left through inefficiency

and oversight. The killing of large 'non-economic' trees in situ increases the growth of smaller commercial species — a process known as 'refining' (Dawkins, 1955, 1967). (Girdling, usually with arsenical or hormonal arborescides, reduces competition for nutrients and water while not seriously disrupting, let alone destroying the ecosystem. The species composition of the forest can thus be slightly 'improved', that is shifted in a more readily exploitable and commercial direction. This method, much used in Malaysia (Wong, 1966), is clearly ecologically preferable to clearcutting (cf. Wood, 1971) and, in the long term, to the tree oligocultures or monocultures, which often follow.

The valid criticism of such refining (Meijer, 1973) is that logging extracts about the same amount of biomass as that killed in refining as practiced to date. Nutrient determinations will indicate which species can be killed in order to reduce nutrient competition most effectively. If the proportion of number of species killed is kept small, and if dead trees are eventually utilized, judicious refining offers promise for sustainable use. When techniques improve, the careful selective logging of trees as they become mature will become more attractive, particularly if roots, leaves, branches and bark are left in the forest, for these represent nearly all of the nutrient capital. Most lumber itself is oligotrophic, being composed almost entirely of the relatively plentiful raw materials, C, H, O and N. This discretionary practice similarly depends on a small, highly skilled labor force.

The end of the world's hydrocarbon squandering spree is so imminent that hydrocarbon and petrochemical derivative prices have already started soaring and will certainly continue to do so. Among the valuable environmental benefits of this process will be an increase in the value of many plant products such as rubber, cellulose, lumber, cordage, methane, methanol and ethanol. All of these can be manufactured principally from air, sun and water; and Amazonia is one of the largest areas in the world where both the plant materials and physical requirements are abundant and free. Thus, the preparation and export of these products involves little loss of nutrients. This suggests a place for saw mills, pulp mills, sawdust for power, sail and sawdust for fluvial transport, and incorporating hydrocarbon or carbohydrate production. Ash should be returned to the ecosystem, possibly as nursery established saplings.

Alcohol and methane are relatively simple and cheap to manufacture from the forest, they are easy to transport, they are not subject to irrevocable deterioration or loss of quality during storage and they are becoming increasingly valuable on world markets as well as at points of origin. Mixed-species cellulose and pulp (Pandolfo, 1967) is a possibility if nutrients and protein are removed first or if the profit is calculated after fertilizer and reforestation have been paid for. One ton of wood is said to produce the equivalent of two barrels of petroleum (Veja, March 13th, 1974). Fluvial and rail transportation systems depending on wood or charcoal therefore make more ecological sense than roads depending on petroleum.

Source: Goodland and Irwin (1975)

Source: Goodland and Irwin (1975)

From the point of view of avoiding damage to the forest ecosystem, the retention and utilization of the canopy has distinct advantages. Part of the canopy can be harvested without dangerously impairing its protective role. After much delay the great value of leaf protein is now appreciated and the requisite technology is available for its production (Pirie, 1971). An environmentally productive line of enquiry therefore is to ascertain how and to what extent canopy can be harvested without causing irreparable damage. Canopy harvest would entail export of nutrients which would have to be restored to the ecosystem eventually if the loss cannot be kept less than the gain by natural increment.

Artificial communities of mixed-species tree-crops suffer from powerful inherent defects. Establishment of a plantation without clear-cutting is difficult and expensive yet environmentally less deleterious. One method would be to start creating the artificial community at the same time as 'refined' forest is exploited. The nurture and harvesting of mixed species crops is similarly expensive as some species demand treatment incompatible with that for other species. These problems are alleviated as the number of species comprising the plantation is lowered. But as the community is simplified, the threat of depredation by pests increases. Control of pests is crucial because the loss of one tree crop is many times worse than the loss of one seasonal crop. On the one hand, trees are a long-term investment, and it is painfully slow to breed resistant and productive strains of trees; on the other, the swift evolution of pernicious pests proceeds unabated. Bananas, plantains and their relatives (*Musa* spp.) could be mixed with other fruit trees (Table VIII) together with rubber, cacao and nitrogen-fixing legumes in a community physiognomically, physiologically and taxonomically diverse.

TABLE VIII

International name	Family	Vernacular name	
		English	Portuguese
<i>Bertholletia excelsa</i>	Lecythidaceae	Brazil Nut	Castanhaeira do Para
<i>Cocos nucifera</i>	Palmeae	Coconut	Côco da Bahia
<i>Cariba pentandra</i>	Bombacaceae	Kapok	Faina
<i>Cola nitida</i>	Sterculiaceae	Kolanut	Noz de Cola
<i>Euterpe oedulis</i>	Palmeae	Açai	Açai
<i>Copaifera</i> spp.	Leg. Caesalpinioideae	Copaiba	Copaiba
<i>Guilandina</i>	Palmeae	Peach palm	Pupumba
<i>Lecythis zabacajo</i>	Lecythidaceae	Monkey pot	Sapucaia
<i>Mucalamia ternifolia</i>	Protaceae	Macadamia	Noz-macadaia
<i>Myristica fragrans</i>	Myristicaceae	Nutmeg	Alcabate
<i>Persea gratissima</i>	Lauraceae	Avocado	Cacau
<i>Theobroma cacao</i>	Sterculiaceae	Cacao	Cacau
<i>Theobroma grandiflorum</i>	Sterculiaceae	Cupuaçu	Cupuaçu

Dedicated to augment and accelerate harvests on the short term, tropical agronomy squanders natural capital and irreconcilably conflicts with ecology which seeks to balance export with import. Depauperate tropical latosols have little capital and are totally inappropriate for seasonal, herbaceous crops, all of which place high uptake demands on the soil. The cultivation of annual crops such as rice, maize, sugar, manihot and beans on such a substrate is therefore ecologically incongruous and agronomically unsustainable. Moreover, animal husbandry on pasture, where the ground is less protected than in forest, where overgrazing and trampling accelerate erosion and leaching, and where nutrients are exported when concentrated in the form of cattle, is a still less sustainable practice. In any case, meat-eating throughout the world is likely to be sharply curtailed within a generation. Pasture can be improved by mixing perennial grass species with nitrogen-fixing legumes and protecting the sward with a woody leguminous and fruit-tree shade. The situation is further improved to the extent that elevated browse relieves the pressure of ground-level grazing. Even so, cattle are not a sustainable solution for Amazonia: the news that millions of km² of forest (Dos Reis, 1974) are to be cleared and converted to industrial ranches can only herald rapid and catastrophic environmental destruction. "The ruminant can be interposed between this inhospitable and precarious regime and the human being . . ." (J.G. Davies, 1964) to the detriment of all, we might add.

Riparian agro-ecosystems

Clearly any harvest sustained by water-borne nutrients has a signal advantage, and várzea has been discussed in this context. Similarly, fish may prove to be the most valuable sustainable and commercial possibility of the entire region. Their nutrients originate mainly from Andean erosion with contributions from the forest, from forest leachings and the air. Their food originates mainly as aquatic algae augmented by vegetable material (mostly leaves and fruit) contributed from riparian forest, riverbanks and seasonal flood plains. Fish nutrition is therefore relatively independent of the fragile Amazonian forest. A diet emphasizing roots and fish is ecologically preferable to one of mammalian meat and grain.

Amazonia is accurately characterized as a region dominated by rivers, containing 20 000 km of navigable waterway (Resende, 1973). The 1 100 tributaries of the Amazon combine to form by far the world's most voluminous river. This massive watercourse is exploited by approx. 2 000 species of fish (De Menezes, 1967), the world's richest fish fauna even when compared with the Zaire fish fauna which has less than 1 000 species. There are over 700 species within 20 km of Manaus alone. Fish in Amazonia are an underexploited resource, approximately 50 000 tons being harvested annually. In 1964 the region exported nearly 300 000 kg. wet imported over twice that amount (De Menezes, 1967). Exporters of living ornamental fish alone earned over US \$15 000 in 1957.

Source: Goodland and Irwin (1975)

Although fish culture barely exists, improved fishing technology and co-operatives could probably multiply fish production several-fold. Fish cultivation in impoundments and lakes seasonally renewed by flood could further swell production. Small mobile ice factories and freezers, in combination with cottage-industry salt, pickled-and-smoked-fish preservation, are environmentally sound and appear likely to promote fish as one of the brightest economic possibilities of the whole area. Conventional agriculture, it should be remembered, is frequently detrimental to both river and ocean fish.

Much of the technology need not extend beyond the skill and resources of the people. A sizable proportion of the present population would be gainfully employed, vastly relieving both the strained economy and the mounting pressure on the fragile environment. It is significant that nearly all aboriginal settlement was closely associated with river, vitzea and riparian forest before European colonization; the concomitant denaturation of the Amerindian tribes provoked their decline. Rivers remain the principal resources of Amazonia and only if this fact is acted upon will there be any reasonable hope for preserving the environment.

Finally, the local riparian fauna, if farmed, would be a valuable and sustainable food source. Alligators, turtles, capybara, tapir, paca, manatee and dolphin all command high prices and could be raised from nutrients mainly of fluvial origin. The Amazon carries thousands of rounded floating mats of living grass and intermixed vegetation called 'matupa', often of huge (< 10 m diameter) size. These could be totally harvested for fodder or methane with no harmful effects on the terrestrial environment. Water buffalo promise to be more viable and less harmful to the environment than the usual cattle, and for a number of years have been successfully raised on the island of Marajó in the Amazon estuary. Turtles (*Podocnemis expansa*), formerly referred to as the 'cattle of the Amazon', were raised in abundance by Amerindians.

Home gardens

In addition, each family should be encouraged to cultivate a small home garden largely of vegetable and fruit perennials, and this merits research as much as, if not more than, any of the preceding topics. Ideally, because of requisite lead time, the basic mixture of trees should be planted several years before the settlers arrive.

An ecologically-designed garden based on fruit trees with some small mammals and chickens integrated into a closed ecosystem incorporating household wastes (Anderson, 1954; Terra, 1966) could be much more reliable than the export-oriented agriculture promoted at present.

A short list of suitable perennial species follows (Table IX). As the aim is to have some components producing all the time, the variety and age range should be as great as possible. Such gardens are indefinitely sustainable if the ground is kept covered with mulch or vines to prevent weeds, soil compaction and erosion. In this connection a short list of 'fillers' is appended (Table X). It

TABLE IX

Home garden candidates	Family	Vernacular name	Portuguese
International name	Family	English	Portuguese
<i>Annona</i> sp.	Annonaceae	Annona	Annona
<i>Artocarpus communis</i>	Moraceae	Breadfruit	Fruita-pão
<i>Artocarpus integrifolia</i>	Moraceae	Jackfruit	Jaca
<i>Carica papaya</i>	Caricaceae	Papaya	Mamão
<i>Citrus</i> spp.	Rutaceae	Citrus	Citrus
<i>Cocos nucifera</i>	Palmae	Coconut	Côco de Bahia
<i>Coffea robusta</i>	Rubiaceae	Coffee	Café
<i>Elaeis guineensis</i>	Palmae	Oilpalm	Dendê
<i>Musa</i> spp.	Musaceae	Banana, etc.	Banana, etc.
<i>Psidium guajava</i>	Myrtaceae	Guava	Goiaba
<i>Ricinus communis</i>	Euphorbiaceae	Castor bean	Mamona

TABLE X

Home garden fillers	Family	Vernacular name	English	Portuguese
International name	Family	English	Portuguese	Portuguese
<i>Banisteriopsis caapi</i>	Malpighiaceae			Firetro
<i>Bassella alba</i>	Basellaceae			Melancia
<i>Chrysanthemum cinerariifolium</i>	Compositae			Curnaru
<i>Citrullus</i> sp.	Cucurbitaceae			Melão
<i>Courmaroua odorata</i>	Leg. Papilionoideae			Squash, pumpkin
<i>Cucumis</i> spp.	Cucurbitaceae			Abóbora
<i>Cucurbita</i> spp.	Cucurbitaceae			Citronella
<i>Cymbopogon nardus</i>	Gramineae			Lemongrass
<i>Cymbopogon citratus</i>	Gramineae			Yam
<i>Dioscorea</i> spp.	Dioscoreaceae			Sweetpotato
<i>Ipomoea batatas</i>	Convolvulaceae			Batata doce
<i>Ocimum basilicum</i>	Labiatae			Basil
<i>Pullinia cupana</i>	Sapindaceae			Guarana
<i>Passiflora</i> spp.	Passifloraceae			Passion fruit
<i>Piper nigrum</i>	Leg. Papilionoideae			Bean
<i>Puraria phaseoloides</i>	Piperaceae			Black pepper
<i>Vigna sinensis</i>	Leg. Papilionoideae			Kudzu
<i>Zingiber officinale</i>	Leg. Papilionoideae			Cow Pea
	Zingiberaceae			Ginger

should be remembered that some plants aid in repelling insects. This phenomenon is not widely exploited in modern tropical practice but the idea should be reascutated and developed if possible. Some possibilities such as citronella and pyrethrum are included in the table.

However, it seems unlikely that shifting agriculture can indefinitely support more than ten people per km² (Nye and Greenland, 1960; Richards, 1967). In poignant contrast with crop production in temperate zones, agriculture practiced in tropical forest cannot sustain large numbers of people indefinitely.

The 50% forest rule

The principal governmental body charged with conservation, IBDF (Instituto Brasileiro de Desenvolvimento Florestal, the Brazilian Institute of Forestry Development), concerned with wholesale extirpation of tree species, passed a law designed to mitigate destruction of the forests. This law requires each colonist to preserve 50% of the area of his lot as forest (PIN, no date). This means 50% of the forest should not be completely felled, although the collection of forest products such as fruits and nuts, is therein permitted and encouraged.

While ostensibly an effective means of ensuring environmental protection, this law may intensify the very damage it is designed to prevent. Animals and plants have a minimum area of habitat in which they can survive. For some organisms, this area is small; mosquitos and ruderals persist in a few m² for example. For many organisms a cultivated field is an impassable barrier so that they will effectively be incarcerated in a 50 ha cell. Some kinds of organisms may persist for the remainder of their generation but will not be successfully perpetuated. The colonist's activities in the forested half of his land will further hasten the extermination of many organisms.

At the same time, organisms thriving in such disturbed habitats as fields and forest edges will swiftly increase. Many of these organisms are undesirable to humans, such as weeds, ruderal organisms, insects and rodents and will forcefully compete with the colonist for limited resources. The forest provides a perpetual source of infection, particularly of insect pests, for the surrounding agriculture. Thus, in many ways Amazonian agriculture would benefit from complete isolation from the forest. In short, the 50% rule penalizes agriculture, fails to protect the forest to any significant degree, and encourages pests. Infinitely more effective would be the total and enforced proscription of agriculture in a single preserve amounting to 50% of the area of Amazonia.

Source: Goodland and Irwin (1975)

Fish fauna

More species of fish can be caught in an Amazonian pond smaller than a tennis court than in all the rivers of Europe combined; thus observed Agassiz (1909). The Amazon contains the world's richest fish fauna — possibly 2 000 species — whereas the next richest, in the Congo River, contains only 1 000 species, and the Mississippi barely 250 (Myers, 1947).

There are no lists of even the common Amazonian fish and any current list would be incomplete and most selective. The following list (Table XXIII) is an attempt to compile names of fish from among the 100 kinds commonly marketed in Amazonia. It also includes otherwise noteworthy fish. Actually, much of the complexity of the Amazonian fish fauna derives from the fact that half the species are small characids of generally similar form and appearance. Lowe-McConnell (1967) raises the interesting query about how so many similar species manage to co-exist.

At present, the bionomics of fish is so totally unknown that the impact of the highways cannot be predicted with much certainty. Deforestation (Fig. 8) will inevitably curtail the amount of fish food entering the rivers. Fishing pressure will increase sharply commensurate with population density, but if limited to the use of hooks, seining, vegetable stupeficients, and archery, fishing is unlikely to harm the fish fauna. Certain types of fish traps, explosives, and poisons, however, can rapidly damage the fish fauna. Such methods are prohibited by law which is not stringently enforced at present. Fish are a woefully underexploited resource in Amazonia, but one representing encouraging potential for relatively easy and sustainable development (J.A. Mendes, 1938; Hickling, 1961, 1962; Verissimo, 1970; De Menezes, 1972). Black-water and white-water fish fauna offer quite different potentials for management (see limnology section) and this distinction must be taken into account when planning the fisheries.

Principal crops being raised on the Transamazônica in approximate order of value to the colonist

Name of crop	Permanent (P) or temporary (T)		Grown mainly for subsistence (S) or for commerce (C)
	English	Portuguese	
<i>Oryza sativa</i>	Rice	Arroz	S
<i>Manihot esculenta</i>	Manihot	Mandioca	S
<i>Musa paradisiaca</i>	Bananas	Banana	S
<i>Phaseolus</i> spp.	Beans	Feijão	S
<i>Zea mays</i>	Maize	Milho	S
<i>Cocos nucifera</i>	Coconut	Côco	S
<i>Saccharum officinarum</i>	Sugarcane	Cana	S
<i>Cucurbita</i> spp.	Pumpkin	Abóbora	S
<i>Citrus</i> spp.	Citrus	Laranja, limão	S
<i>Anacardium occidentale</i>	Cashew	Cast	S
<i>Carica papaya</i>	Papaya	Mamão	S
<i>Coffea arabica</i>	Coffee	Café	S
<i>Nicotiana tabacum</i>	Tobacco	Fumo	S
<i>Arachis hypogaea</i>	Peanuts	Amendoim	S
<i>Ricinus communis</i>	Castor bean	Mamona	S
<i>Gossypium herbaceum</i>	Cotton	Algodão	C
<i>Ananas comosus</i>	Pineapple	Abacaxi	S
<i>Mangifera indica</i>	Mango	Manga	S
<i>Theobroma cacao</i>	Cacao	Cacau	C
<i>Glycine max</i>	Soya	Soja	S
<i>Piper nigrum</i>	Black pepper	Pimenta do reino	C
<i>Hevea brasiliensis</i>	Rubber	Seringa	C

MIXED CROPPING AND CROP DIVERSIFICATION

The advantages and disadvantages of mixed cropping in field and crop diversification in a large region have long been debated by tropical agronomists. In the tropics, maize is grown with a variety of crops, from such tree crops as coffee and cocoa, to sugarcane, cotton, and, more commonly, legumes and root crops. This widespread practice of mixed cropping, notably in shifting cultivation, has added diversity to crop combinations in some tropical regions.

It has been argued [17] that from an ecological point of view, mixed cropping is superior to monoculture in the tropics because it stimulates the multi-storied physiognomy of the natural climax vegetation, thus "attaining an extraordinary large leaf-area index." This argument is fallacious. In natural climax vegetation, the large number of leaves are distributed over a great height, thus allowing the radiation to penetrate deeply to the ground for photosynthetic use of undergrowth. On the other hand, herbaceous annual or biennial crops such as sugarcane, rice, and maize may have an almost equally high leaf area index concentrated within a few feet above the ground. Their leaf area density is generally ten times as large as in forest canopies. The sunlight reaching the ground surface will not be able to support another crop except during the early planting stage. In a series of experiments including several herbaceous crops, Haizel [13] has reported that on no occasion did the yield of any of the mixtures exceed the highest yielding species in pure stand. Only when the mixed cropping includes tree crops such as rubber and cocoa is the superiority of mixed cropping over a pure stand evident [16].

Other often-cited reasons for mixed cropping include the more efficient use of water, the reduction of the incidence of pests and diseases, and the lessening of erosion hazard. It may be argued that the efficiency of water use and the susceptibility to soil erosion are largely determined by cultivation practices and selection of crops. In general, efficiency of water use by mature trees is lower than by herbaceous crops. Modern methods of mechanization, fertilization, weed control, as well as pest and disease prevention measures are greatly hindered in mixed stands. It seems that mixed cropping may be the better farming system in some tropical areas only at the present stage of development. With the establishment of public infrastructure essential to modern agriculture, the importance of mixed cropping will gradually decline. The superiority of monoculture of rice in Southeast Asia over mixed cropping in many primitive parts of the tropics is unmistakable.

On a regional basis, the relative merits of diversified farming versus specialized agriculture are largely a matter of economics. Since yields of almost all the crops are much lower in the tropics than in the temperate zone, the tropics are at a disadvantage to develop specialized commercial crops which could also be grown in the temperate zone.

**Source: Tropical Agriculture:
Crop Diversity and Crop Yields**

by Jen-Hu Chang in Vol 53 of
'Economic Geography' 1977.

To the tropical environment the farming practices of southeast Asia were well adapted. Clearing of the forest was seldom complete, and cover was left to screen the soils. A variety of root crops, shrubs, and trees were planted that, in turn, provided additional soil cover. Usually the crops had different ripening periods so there was no distinct harvest season followed by the exposure of bare ground. Cultivation of the soil with hand tools left no long furrows of upturned soil exposed to sun and rain. Abandonment and return to forest in the ladang system prevented permanent damage. The absence of herding and grazing animals in most areas prevented the pressure on watershed vegetation with the consequent erosion and flooding which has destroyed farmlands elsewhere. So long as populations were low in relation to the available land area, the amount of damage done through land use was negligible. However, with expanding population pressure, the continued existence of climax rain forest is threatened by the too rapid spread of forest clearing.

In many parts of the tropics shifting ladang agriculture has given way to more permanent types. These have been chiefly of two kinds: the permanent village garden and the irrigated field. In the vicinity of many of the villages the practice developed of keeping certain areas in permanent cultivation, a practice which gave a food supply close to home when travel to more distant forest clearings was restricted. Such village gardens have been carefully tended. Emphasis on a variety of crops has kept cover on the ground. Exhaustion of fertility has been prevented by the regular addition of manure from village animals and people, combined with crop remains and other plant debris. Constant care given to such gardens has kept them permanently productive despite the handicaps of tropical climate.^{1,13}

The greatest yields in tropical lands, and the basis for the crop surplus which has permitted the rise of cities, have come with the farming of the deep soils of valleys and delta areas. This was made possible by the development of the hydraulic skills that permitted control of rivers and runoff waters and their use in irrigation. On these rich lands the same care and attention which made possible the permanent village garden has been given to the soil. Over thousands of years these soils have remained productive.^{1,13}

Land failure in the tropics has resulted from several types of pressure. The ladang or milpa system breaks down when populations grow too rapidly. Then the land does not receive the rest and regeneration it needs. It is farmed too long and returned to again before there is time for soil damage and fertility to be repaired. Soil depletion results. This is thought to be the reason for the collapse of the Mayan civilization in the American tropics which was supported by milpa agriculture. Extensive deforestation, resulting from demands for wood for fuel or construction, also takes place in the tropics where civilizations give rise to dense populations. This is thought to be a cause for the collapse of the ancient civilization of Ceylon. Here an extensive system of irrigation reservoirs and canals was destroyed by floods and silt washed from the deforested mountains.⁵ Some of the most far-reaching land damage in eastern Asia has taken place in China and India where many bad features of both western and eastern agricultural systems were inherited and combined.¹⁸

Source: Dasmann (1976)

3.0

REGIONAL

PLANNING

Friend J.K. & Jessop W. (1969), Local Government and Strategic Choice,
W. Clowes & Sons Ltd.

"We can now put forward the proposition that any process of choice will become a process of planning (or strategic choice) if the selection of current actions is made only after a formulation and comparison of possible solutions over a wider field of decision relating to certain anticipated as well as current situations.

"No national body will be able to use its authority to connect to good advantage unless it has the capacity to scorn the whole vast range of activities which may at any time be expected to come within its field of interest. This problem may become somewhat more manageable if some part of the total scanning activity could be organised at regional rather than national level.

" The amount of effort which the planner might usefully expend on preliminary explanations of the feasibility of particular options can itself be regarded as a matter for strategic choice, e.g. resources such as time, skill, money, risk of blind alleys , risk of rejecting options out of hand which could lead to better planning solutions."

Reduce Uncertainty or areas of Doubt describe assumptions under the headings "extremely critical", "very critical" and "fairly critical," for example:

Extremely critical assumptions: Future residential growth in the region
UR = broader evaluation of alternatives

Location of future industrial development UR = broader evaluation

Future development of public transport in the region UR.

Commuters' choice: bus, car or train? UE = research/develop. behaviour models.

Very critical assumptions: Future facilities (social services) in a city UR.

How to define effect measures? UV = est. preferences of policy group

Fairly critical assumptions: Choice of an alternative UR = broader evaluation.

Current levels of unemployment per employment sector UE = surveys, enquête?

Relative importance of short-term/longer term traffic, housing, services improvements UV = est. preferences of policy group who choose an alternative.

UE = environment the plan is meant to control; UV=policy values to guide this control; UR = interrelated decision or policy areas controlling environment.

"The choice of a programme of exploratory actions requires a balancing between their expected costs and their expected effectiveness as means of improving the basis of strategic choice."

Regional plans prepared within the context of the national plan should provide the machinery for the practical solution of the problems of industrial location, infrastructure development and settlement growth. In many countries (developed and developing) there is no effective planning machinery at this level. But the national plan is not, except in the smallest countries, an appropriate vehicle for deciding the specific location of major developments as it cannot take into account local problems and environmental issues. Local authorities, on the other hand, have no power to control activities outside their boundaries which have an important bearing on local issues. 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.

The major issue for regional planning is the interrelationship between the various settlements of the region 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 agricultural land. Regional planning introduces a spatial and territorial dimension into the planning process: it is the point at which policies and activities are tied to specific locations.

The five major policy areas also apply to the regional level.

1 *Sectoral Policies and Actions.* In this category are included policies for urban-rural relationships, migration and population distribution within the region, industrialisation and the distribution of housing, hospitals, health centres and schools, as well as regional plans for land use, communications and road networks. The actual provision of services and the construction of infrastructural and other works may be undertaken at this or the local level.

Source: UN Conference on the Human Environment, Stockholm, 1972.

2 *Areal Policies and Actions.* At the regional level the definition of development areas, 'growth poles', and so on, may be further refined and integrated with physical planning policies.

3 *Allocation.* Ideally there should be considerable regional discretion in the allocation of financial resources between policy sectors and localities within the region, irrespective of whether national allocations are primarily based on sectors or on regions. In the latter case, however, there tends to be more room for regional discretion in allocating resources according to regionally-determined priorities.

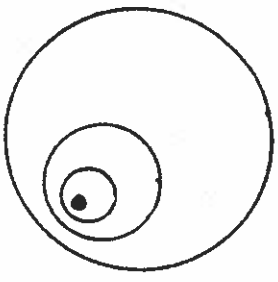
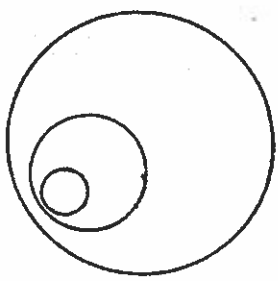
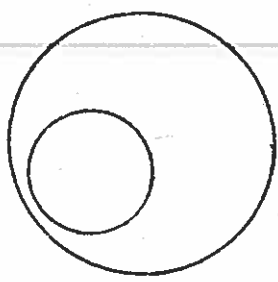
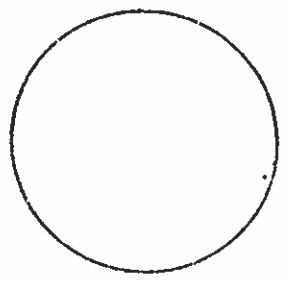
4 *Equalisation.* This policy area is generally much less crucial at the regional level but may be of some significance, especially if the features of the region are markedly different from those of other parts of the country and therefore require deviation from national policies. This situation occurs quite often in developing countries but less often in advanced countries, where cultural, social and economic affairs have generally reached a high level of integration.

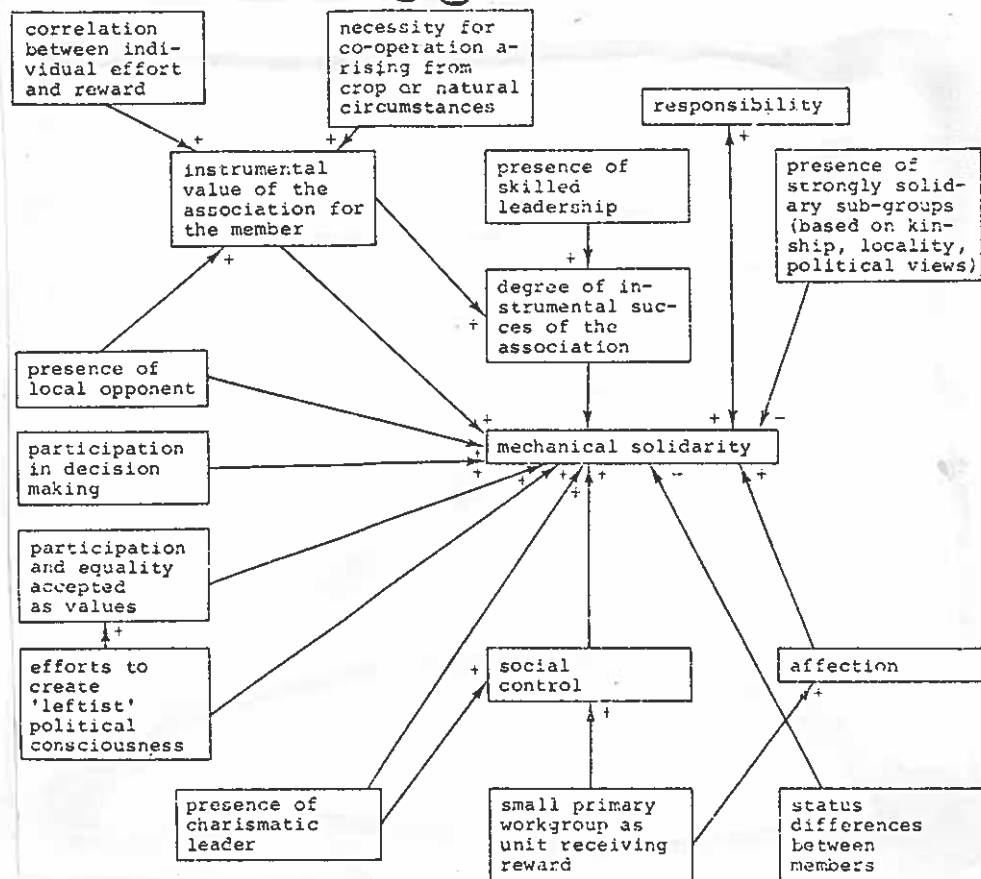
5 *Control.* Regional control should be exercised over decisions taken by local authorities to ensure their integration and compliance with regional policies and plans.

It is at the level of local comprehensive planning that all the sectoral policies are brought together and applied to particular problems and issues. Local plans must be prepared within the framework and in accordance with the guidelines provided by national and regional plans. Given these inputs, the task of comprehensive planning at this level is to design a staged programme of investments and their spatial distribution within the locality. Alternative proposals should be evaluated against the social, economic, biological and aesthetic needs of the population. The aim should be to integrate, and establish harmonious relationships among, the many different components of each settlement so that actions taken with respect to one element will not produce undesirable effects on the others. This involves designing a system that interrelates the economic activities of the settlement, including industry, commerce and services; residential areas, transport and communication systems; recreation and leisure-time activities; infrastructure networks; public housing.

An ideal example. Various levels of planning possible within a country Source: Rural Centre Planning (1978)

	Natioani planning level	Regional planning level	Area-planning level	Local planning level
Executive planning committee.	National Development Planning Committee. (N.D.P.C.).	Regional Development Planning Committee. (R.D.P.C.).	Area-Development Planning Committee. (A.D.P.C.).	Community Development Committee. (C.D.C.).
Horizontal coordination.	Coordination of the national sector planning.	Coordination of the regional sector planning.	Coordination of the areas sector planning.	Coordination of all local public activities.
Vertical integration and coordination.	N.D.P.C.	R.D.P.C.	A.D.P.C.	C.D.C.
Integration.	Integration of the national sector and facet planning.	Integration of the regional sector and facet planning.	Integration of the areas sector and facet planning.	Integration of all local development planning.
Implementation.	All works of merely national interest.	All works of merely regional interest.	All works of merely micro-regional interest.	All work of local interest.
Planning.	Policy level. Structural-strategic.	Policy level. Structural-strategic level. Project level.	Project level.	Project level.
Spatial distribution.	Macro-region.	Meso-region.	Micro-region.	Community.





Solidary behaviour, the willingness to make sacrifices for the sake of others, is in the first instance a gift and we know from the anthropological literature (e.g. Mauss, 1967) that a gift creates obligations for the recipient. He must reciprocate in some way. In a very worthwhile article Gouldner (1960) has pointed out that reciprocity appears to be a general human norm, which, moreover, is implicitly assumed in functional theory. If a person displays solidarity with a group this can be very functional for that group, but does not explain why this solidary behaviour persists. The real reason is that the individual displaying solidarity is recompensed. What are the advantages with which other group members can and must reward solidarity? One form of compensation is *reciprocity* in solidary behaviour. This reciprocity assumes that the group in question already recognizes norms governing the behaviour of members of associations. Another form of return consists in giving *prestige* to the solidary individual and, not infrequently, a leadership function as well. This will occur chiefly where norms and roles have not yet been elaborated. Finally, another possibility is failure to recognize the sacrifice. The others will then continue to wonder suspiciously just what selfish gain the solidary individual aspires to.

At this point it seems advisable to recapitulate briefly the most important findings we have made thus far:

- Peasant organizations cannot function solely on the basis of the interest, the material reward of the members. Mechanical solidarity is required in the initial period, and as the differentiation of tasks and rewards within the organization increases so too does the need for organic solidarity.
- Both the mechanical and the organic solidarity of the members with such an organization is impaired by a strong mechanical solidarity within sub-groups.
- The best distribution of rights and obligations is that which is regarded as just and accepted as a norm. Participation by units and sub-groups in decisions affecting this distribution appears to be the best way of achieving this.
- On the other hand an outside answer to the question of what is just and what scope the value of justice ought to have may also be accepted. In this case we are dealing with what may be called growing political awareness. This, however, is a cultural innovation which had not yet been adopted by the majority of Chilean peasants at the time of our research.

Source: Galjart B., (1976), Peasant Mobilization and Solidarity

4.1

COMMUNITIES

THE KIBBUTZ

Kanovsky, E., (1966), The Economy of the Israeli Kibbutz

Harvard University Press.

"The Kibbutzim were motivated by the fulfillment of Jewish national goals rather than by private profit," a basic principle being "from each according to his ability and to each according to his needs."

"The goals of the kibbutz economy have been defined as: a) colonization of the land b) increasing production, especially agricultural production c) expansion of the agricultural production d) the attainment of a 'decent' standard of living for the members".

"Of the three major kibbutz federations, the one with the strongest Marxist convictions has emerged as the strongest federation and has gained in population in recent years." The kibbutz is divided into branches of production and consumption. The productive divisions include field crops, vegetables, fruit, plantations, dairy, poultry, machine shop, carpentry, etc. in many cases there are industrial units as well.

"...in addition to the underlying (attenuated) ideological convictions of the kibbutz member, the economic security afforded by the kibbutz is a strong motivating force. So long as he remains in the kibbutz he will not face the problems of unemployment, seasonal or cyclical. No personal misfortune will affect the economic well-being of his family and the kibbutz will provide for his old age.

"....strong incentive to acquire some special skill " because he is moved around from job to job and (because of this) looked down on by others

"In the kibbutz the division of labour between the income-producing branches and the service branches is dependent largely upon the ratio of children to adults.

"For the kibbutz as a whole the concept of profit or loss is equivalent to saving or dissaving in a household.... This profits (i.e. saving) could be increased.... by lowering consumption costs.

"However, the goal of the diversified economy often runs counter to the maximization of profits and will frequently bring about lower average net incomes than those obtainable through specialization.

"All available data seem to indicate that the average annual increase in productivity in the collective agricultural economy has been unusually high, exceeding the very high rates prevalent in Israeli agriculture as a whole.

"However, model farms, incorporating some of the principles and techniques of the Israeli commune might have a beneficial effect on the social and economic development of the less developed countries."

Klatzmann, J. et al., (1971) The Role of group Action in the Industrialization of Rural Areas, Praeger.

"...intensify economic activities in rural areas in order to mobilize surplus manpower. This involves a) intensification of agriculture itself wherever such possibilities exist b) location of industries in rural areas (rural industrialization) and c) developing and providing employment in other forms of economic activities in rural areas, such as through construction projects and the decentralization of education and health services, recreational and tourist facilities, etc.

".....the other reason for rural industrialization is that the raw materials from agriculture, animal husbandry, forestry and sometimes fisheries which are important bases for industry in the early states of industrialization, can often be processed without disadvantage in villages or rural market towns, thereby producing better avenues for seasonal employment of the agricultural labour force and leaving sufficient hands available for the peak season of agricultural activities....these industries, when located in rural areas, are more acceptable to rural populations because they seem to fit the environment conditions of agricultural areas and their complementary role in agriculture is better understood."

There are three major types of service centres (in Israel) according to I. Prion in "Development Trends of Spatial Rural Cooperation in Israel".

- 1) The rural center proper: supplies economic and social services to four to eight settlements, usually moshavim (smallholder cooperatives). These services include a school, a clinic, a sorting station for agricultural produce etc.
- 2) The regional center: serves 10 to 30 settlements and includes regional services for agriculture, such as processing plants and sometimes also social and cultural services on a higher level than the rural centres such as an amphitheater.
- 3) The interregional center includes large scale enterprises common to many settlements.

Leaders and managers of regional cooperation aim at reaching the stage where manpower requirements are met by members of the participating villages only.

NATIONAL AND UNIVERSITY
INSTITUTE OF AGRICULTURE
REHOVOT
SETTLEMENT STUDY CENTRE



REGIONAL
COOPERATION
IN ISRAEL

Dr. RAANAN WEITZ (RURAL SETTLEMENT DEPARTMENT OF THE JEWISH AGENCY, AND SETTLEMENT STUDY CENTRE) :

(opening address):

"Rural centre" is the name given to a rural community providing joint services for a group of settlements. Technically speaking, it is a Centre of the third grade, because organizational strata are counted from the family up : family, rural community or village, as we say, and then the rural centre, as distinct from centres of a higher category, such as the rural town, which already belong to the fourth grade.

How to distinguish between the characteristics of the different centres is a problem to be clarified here. Size is not the criterion. Although there is a correlation between the size, that is, the population of the centres and their grading in the scale, the distinction is functional rather than geographic or demographic.

As far as possible all educational and cultural activities and all entertainment and economic services should be centralized in the rural centre so that together with the surrounding cluster of settlements a kind of large rural community may eventually be formed. Only those services should be left in the village which are intimately bound up with the settlers' daily life or are ideologically characteristic of certain group of settlers, so as to preserve their cultural or ethnic framework. This presupposes that we are moving from the closed autonomous and self-supporting community, from classical moshav, such as Nahalal or Kefar Yehezqel, to a similar but much wider community with a much larger number of settlers. This number depends, of course, on economic requirements, but for a well-integrated community it should not be less than 300 to 400 and not more than 600 to 800. If all economic and organizational matters and enterprises, including the keeping of accounts, are to be transferred to the rural centre, the institutions there must obviously be the property of the settlers, so that the centre is owned by the entire community.

The objective is thus to arrive at a cooperative regional community. One of the needs this expanded community should meet is the absorption of the population surplus, i.e. those farmers' sons for whom the individual farms and settlements are unable to provide the necessary income, as well as smallholders compelled by the rising standard of living to amalgamate their farms into larger holdings, and also marginal farmers forced by circumstances out of agricultural occupations. This must be done within the expanded rural community, so as to give stability to the existing social structure, which will in turn make for closer, more stable family integration.

The inhabitants of the centre have the same right to a community of their own as those of every other village. The size of the rural centre should result from its organic growth in line with the functions of the expanded rural community, i.e. the needs of the villagers. Hence the population of the rural centre should not exceed about 50 percent of the people living in the villages which together form the composite rural community.

Source: Rehovot Settlement Study Centre (1969)

ERSHONI, NIR'AM: In talking of cooperation we should be clear about what kind of cooperation is meant, for there are many conceptions of it. For example, cooperation can be solely economic and as such established by non-Socialists as well. We must also distinguish between kibbutz cooperation and mutual aid, however precious the latter is. Kibbutz cooperation entails absolute responsibility, without any reservation, of each member for the other members. Regional inter-kibbutz cooperation, then, means absolute responsibility of each individual for all the others, each settlement for every other settlement. I think we are moving towards this, but if that indeed is our aim then every step being taken should be studied very carefully, for some things done in the name of cooperation may in fact empty our enterprise of real cooperation, just as some things done in the name of an ideal may empty that ideal of its content.

Economic cooperation in itself is not kibbutz cooperation. Cooperative enterprises, if well managed, are more effective than those set up by each kibbutz separately. In our technological age large units are necessary for certain economic functions. But economic cooperation does not ensure kibbutz cooperation. It certainly does not guarantee the preservation of kibbutz values, though, of course, successful economic cooperation in itself does not run counter to our principles. We must coordinate economic efficiency with the preservation of these principles. Through economic cooperation we may bring down the remaining barriers against the use of hired labour in the settlements. Through it a large number and not only a few kibbutz members may turn into successful managers of economic enterprises, and an amphitheatre in this case is also an economic enterprise. But that would make a sham of our principles and values.

In brief, though I think the development must continue, we should look carefully into where it may lead us. As things are going, we may find ourselves with 100 or even 150 kibbutz members in the regional organization and as many as 3,000 hired labourers. There is no limit to what might happen. Hired labourers are already inside the kibbutzim, even though it is against our principles. They may flood our regional economy, leading us astray from our basic conceptions of kibbutz life.

This brings us to a further problem. The collective cooperation proposed, being all-embracing, covers not only the economic field, but everything else — social, educational, ideological and security. There is enormous distance between the simplicity of economic cooperation and the complexities of these other matters. I think we do have to move along this path, but we must clearly understand that we cannot advance in the economic field and leave the rest of the problems to take care of themselves.

We must also be clear about the image we would prefer for the individual social unit, or the kibbutz, within the regional commune. Unless we are sure about that, we may be emptying the social unit of its content, while fostering economic co-operation. I believe that eventually we shall reach the stage of a national commune; we have therefore to ask ourselves, whether within the larger framework we want to maintain the existing settlements or whether we want to liquidate them in order to have the larger framework.

Vision and practicality can, but do not always, go hand in hand. While moving forward step by step towards regional cooperation we must take constant care to safeguard the principles of the individual collective.

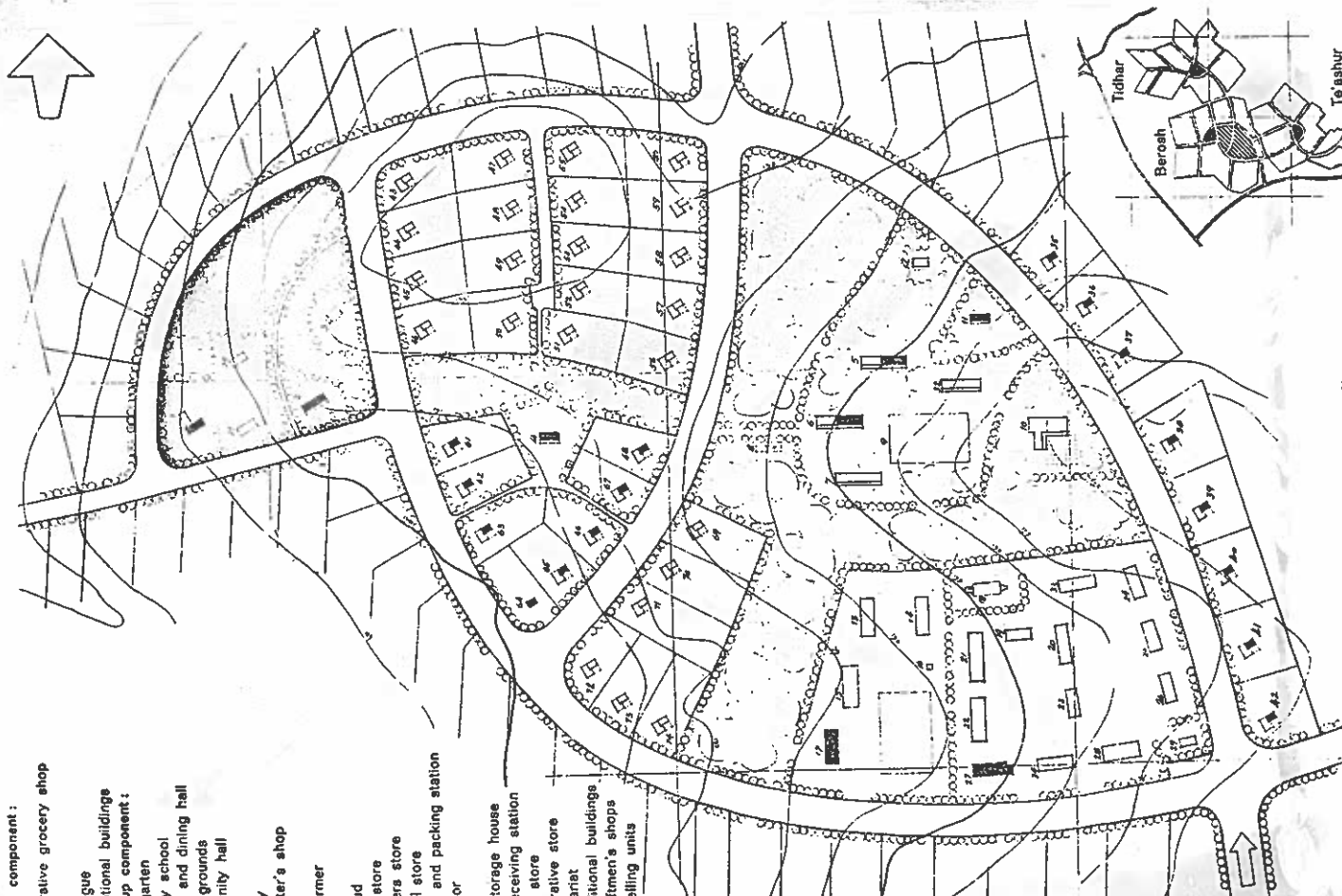
Source: Rehovot (1969)

Berosh

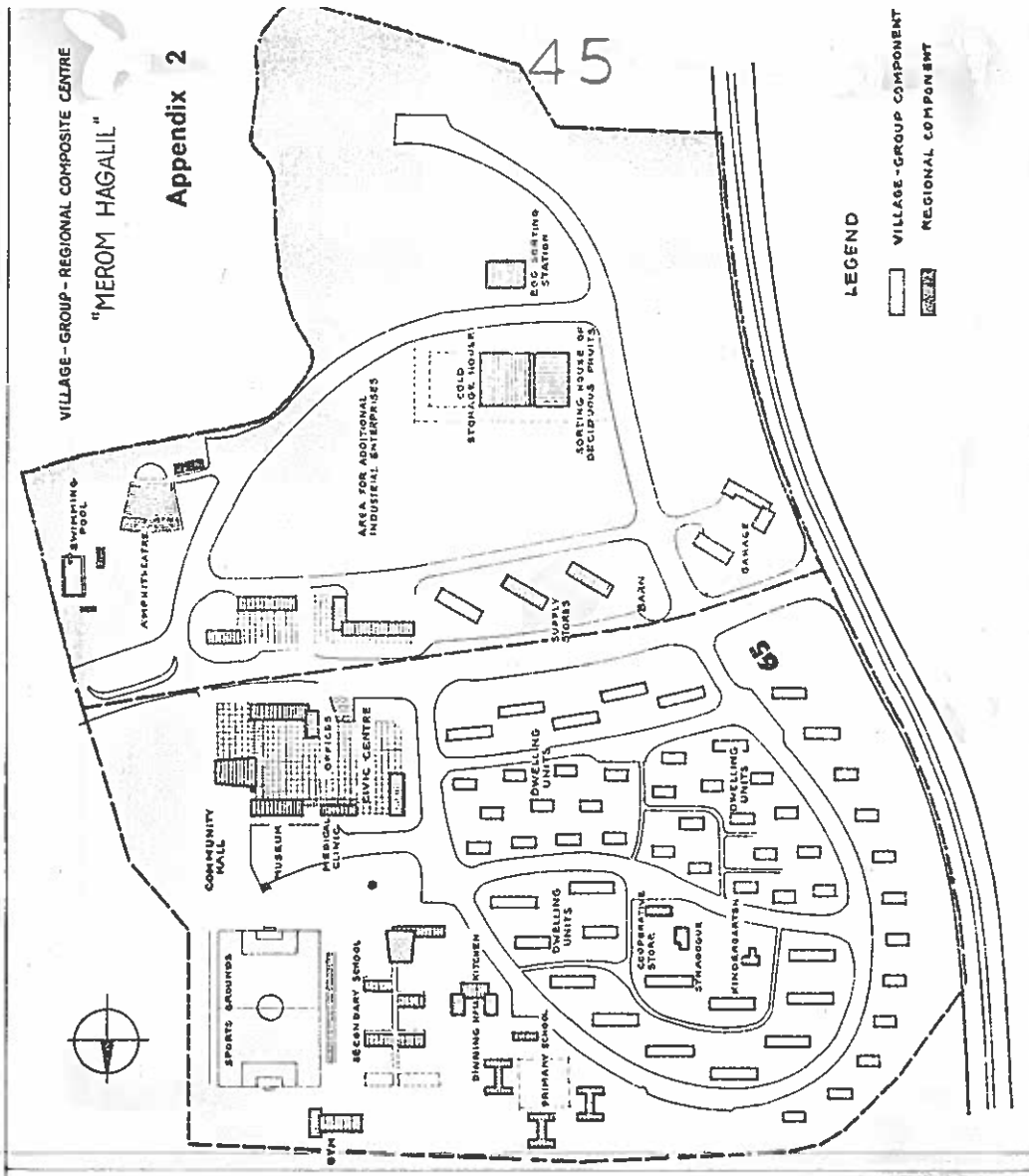
Community — Village - Group Composite Centre

Community component :

1. Cooperative grocery shop
2. Club
3. Synagogue
- 30-31. Additional buildings
- Village-group component :
4. Kindergarten
- 5-7. Primary school
8. Kitchen and dining hall
8. Sports grounds
10. Community hall
12. Milkveh
13. Smithery
14. Carpenter's shop
15. Garage
16. Transformer
17. Shed
18. Bull stud
19. Seeds store
20. Fertilizer store
21. General store
22. Sorting and packing station
23. Incubator
24. Bakery
25. Cold storage house
26. Milk receiving station
27. Supply store
28. Cooperative store
29. Secretariat
- 32-34. Additional buildings
- 35-42. Craftmen's shops
- 43-74. Dwelling units



Source: Rehovot Settlement Study Centre, (1969).



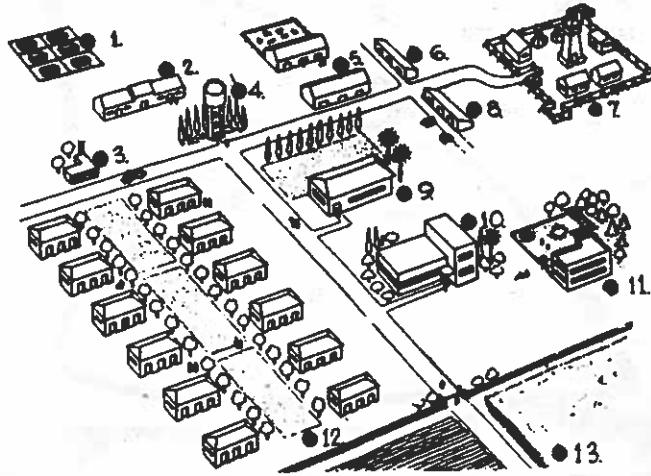
VILLAGE - GROUP - REGIONAL COMPOSITE CENTRE
"MEROM HAGALIL"

Appendix 2

LEGEND

- VILLAGE - GROUP COMPONENT
- REGIONAL COMPONENT

- | | | |
|-----------------------|----------------|------------------------------|
| 1 POULTRY RUNS | 6 WORKSHOPS | 11 CHILDREN'S HOUSE & SCHOOL |
| 2 SHEDS | 7 FORT | 12 LIVING QUARTERS |
| 3 LAUNDRY & BATHROOMS | 8 GARAGE | 13 FIELDS |
| 4 WATER TOWER | 9 CULTURE | |
| 5 STABLES | 10 DINING HALL | |



In its heyday, unlike the Russian collective, the kvutza exercised almost complete autonomy of activity, and yet could sell in a competitive market; it was a community-anarchism that, apart from its nationalism, would have satisfied Kropotkin. Crops, methods, industrialization, education, family relations, interpersonal problems: all directly determined in town meeting. Unhampered by national planning bureaucrats, each community can make use of the skills and resources it happens to have, and manufacture shoes, bricks, processed foods, citrus products—whatever seems convenient and profitable. Also, by entering into exchange with other autonomous communities of the same kind—for they form an even international federation—they partly avoid the stranglehold of the cash nexus. There is at least the nucleus of a sufficient technology initiated and governed completely from below.

More remarkable than making the desert bloom, these communities have invented, and somewhat proved, a new idea about the upbringing of children. The parents have private quarters, which provide home, love, and emotional security also for the children; but the education and discipline of the children belongs to the entire community, peers and the productive life of the adults: more objective and friendly than parents. (This requires, of course, a small community where everybody knows everybody. When the kvutza grows beyond this it must split up.) The young people of this training whom one meets—"cactus-fruit," as they call themselves—are, as one would expect, characteristically brash, good-looking, know-it-all but not disrespectful, self-reliant but not really independent, sentimental, and very provincial. The brand of an integrated community, better than other brands.

Naturally, with the establishment of the national state, these communities are under heavy pressure. Community anarchism does not fit easily into national states—especially when the overseas aid that has greased the wheels of the Zionist enterprise begins to dry up. Yet in the great present crisis, the unexpected influx of hundreds of thousands of refugee Jews from the surrounding Moslem countries, the communities have been willing and able to receive and train far more than their share: they are stable and adaptable. In the long run, perhaps, the more dangerous threat to their existence is the attraction of urban life (pretty clothes and lipstick for the women, crowds, privacy, bright lights).

Source: P. & P. Goodman (1964)—Communitas

In Kenya, district centres serve populations of about 40,000 and areas of thirty to thirty-five square miles. They are often located at nodal points on the local road network ten to fifteen miles apart. They provide administration at the district officer level, a district court, police post, health centre, secondary school, community hall, postal service and shops. There are two lower levels in the rural settlement hierarchy: market centres (which usually have a dispensary and a secondary school, and in some cases a community hall and postal agency) serve about one-third of a district, while local centres serving populations of about 10,000 usually have a barter market, a primary school and sometimes a dispensary.¹

In Israel the grass-roots unit is the Moshav, an organisation of 80 to 100 farming families. A community centre provides day to day services for five or six Moshavim within a radius of about three kilometres. Regional centres located about ten kilometres from the furthest community centres provide more specialised services and usually have non-farming work forces about equal in size to the farming community they serve.² This example is a good yardstick of the level of urban services that can be provided in an authentic rural setting.

There is probably no single optimum size in terms of either area or population for the various categories of village or district centre in this sort of programme. Different countries have experimented with different figures, and even if, in particular instances, the success of the policy can be ascribed to the right choice of size and area, such experience cannot be considered generally applicable. Each country or region must design its own pattern in the light of prevailing circumstances and tradition as well as in accordance with the desired objectives. One factor which affects the size and layout of individual settlements and needs to be determined locally is the size of the plot of land to be held by each farmer. Another is the maximum convenient distance between the village and the furthest field. Past experience suggests that 10 per cent of the working day can be taken as a reasonable amount of time to be spent on travelling.

Among peasants in Latin America a 10-hour working day appears to be common, indicating a 30-minute limit for the journey between settlement and place of work. The maximum distance is then indicated by the average travelling time.

The location of villages is another important matter to be taken into consideration. Many rural settlements in developing countries are dangerously exposed to landslide or flood, or too close to malarial swamps or other health hazards. The risk is not always fully appreciated, and in several countries new settlements are springing up spontaneously without any guidance on such matters, largely because the machinery is not there to give it. The lack of qualified staff is an acute problem in such areas.

Source: UN Conference on Human Environment, Stockholm, 1972.

4.2

COMUNITIES

UJAMAA

Nyerere, J.K., (1968), Ujamaa - Essays on Socialism
Oxford University Press.

Socialism and Rural Development

The return from the produce of the farm, and from all other activities of the community, would be shared according to the work done and to the needs of the members, with a small amount being paid in taxes and another amount (which is determined by members themselves) invested in their own future. "...and in co-operation with other nearby villages of the same kind, a system of locally based small industries would be possible for the benefit of all involved. Thus a group of villages together could organise their own servicing station for agricultural implements and farm vehicles".

"Progress can be made in three stages

- 1) The first may be to persuade people to move their houses into a single village, if possible near water, and to plant their next year's food crops within easy reach of the area where the houses will be.
- 2) Persuade a group of people - perhaps members of a ten-house-cell, to start a small communal plot (or some other communal activity) on which they work co-operatively.... the people would keep their individual plots; the community farm would be an extra effort instead of each family trying to expand its own acreage.
- 3) The final stage would come when the people have confidence in a community farm, so that they are willing to invest all their efforts in it, simply keeping gardens around their own houses for special vegetables etc.. The socialist village will be really established and other productive community activities can get under way.

"For we are not just trying to go backwards into the traditional past; we are trying to retain the traditional values of human equality and dignity while taking advantage of modern knowledge (economies?) of scale and improved tools."

Nyerere J.K., (1973), Freedom and Development O,U.P

"An Ujamaa village is a voluntary association of people who decide of their own free will to live together and work together for their common good."

"...what we need to develop is people, not things, and that people can only develop themselves.

"We should help a group which decides to start by making sure that they can get adequate land in a convenient parcel. We should help to explain the advantages of working a communal farm, and how the problems can be overcome."

Ujamaa—Essays on Socialism

This paper is the application of the Arusha Declaration to the practical needs of our rural life. It is vital that it be clearly understood, and that we should all work for its implementation. For 'Socialism and Rural Development' is an outline of socialism and self-reliance as it applies to Tanzania's rural life and rural people; and that means as it applies to 95 per cent of our population.

In our countryside there will be national projects; state farms, state forests, national parks, and so on. But these will not be the dominating type of organization for the rural areas. They will be created and run to cater for special problems and special needs. The way the majority of our people will live and work in a socialist Tanzania will be in villages which they themselves create and govern, and which are the basis for the productive activities of the members.

Let us put this objective in its simplest terms. A group of families will live together in a village, and will work together on a common farm for their common benefit. Their houses will be the ones they build for themselves out of their own resources; their farm will be owned jointly, and its produce will be their joint property. The activities of the village, and the type of production they undertake, as well as the distribution of crops and other goods they produce, will all be determined by the village members themselves. For the land will be 'our land' to all the members of the village; the crops will be 'our crops'; the common herd of animals will be 'our herd'. In other words, we shall have an up-to-date, and larger, version of the traditional African family, where the land was 'ours', crops were 'ours', and so on.

The size and composition of the group of people who live together will vary from one part of the country to another,

Source: Nyerere J., (1963).

After the Arusha Declaration

depending upon the soil, the appropriate crops or animal husbandry, and the social customs of the people. But by living together and working together, all of them will be able to be better off. Instead of 40 different families each living separately and each farming their own land, collecting their own water, and sending their children miles to school, they will come together and live in a village. Then, by their joint efforts, they will—in time—be able to bring water into the village; they will be able to build their children's school conveniently near all of them; they will be able to build a community centre and a store for their mutual convenience, and so on. Also, by working together on one farm they will soon be able to invest in an oxen-plough to do much of the work each had previously to do with his own hoe and panga; they will be able to take full advantage of skilled advice about modern methods; they will be able to increase their joint production and their joint prosperity. They will be able jointly to arrange the sale of their produce, and the purchase of the goods they want to buy from outside—perhaps by running their own ujamaa shop. And so on. In other words, a living and working community will have been created. All members of the community will be equal in status and any variations of income will reflect only differences in the amount of work done. They will be working in co-operation, and not in opposition to each other; and they will be governing their own village affairs as well as being able to discuss together national issues which affect them as citizens of Tanzania.

This is the objective. It is stated clearly, and at greater length, in the policy paper. We must understand it so that we know what we are working towards. But it is not something we shall achieve overnight. We have a long way to go.

4.5

COMUNITIES

OTHER MOD-

ELS / IDEAS

Salter, C.L., (1974), Chinese Experiments in Urban Space

UCLA 1974, Friedmann et AL.

The 'down to the countryside' transfer of people "to penetrate the agricultural co-operatives and...assist in the work of the overhauling of the co-operatives and developing spring production", Jan. 1957, R.W. Lees.

'Downward transfer' became a political reprimand for urban elitism with rural sector production as the means of reform. In 1958 it was ordered that every one except the old or sick would have to 'spend at least one month a year in physical labour'. Parallel to this was the Rustication Movement - a return of all youth to their villages if they failed to get a job or qualify for higher education in the city. This involved 15 - 25 million people in late 1960's alone (compare with strategies in post-revolutionary Cuba).

Reverse migration is also encouraged by invalidating individual registration and ration certificates. University registration and admittance to a job may have as pre-requisite a stint in the 'downward transfer' or rustication movement.

The rural-urban city, or 'agrapolitan'centre' effectively combines rural (agro) and urban (indo) production. In Chinese this is called a 'tien ch'eng' or 'field city'. An example is Ta-ch'ing in Heilungkiang province in Northeast China, an agro and indo node in a frontier region to uncover untapped petroleum reserves. Oil refining plant and farming machinery stand side by side. Here it is hoped, will exist no class or social distinction between urban and rural space, or between rural and urban task. Labourers could (should) move through all sectors to productively build a stronger China - Maoist model of urban growth.

Urbs in horto = horticultural functions in the city limits - the coincident pursuit of rural and urban tasks in spatial and occupational harmony.

Ward, H., (1973), China and the Third World, London Press.

"The inevitable drift of population to growing industrial centres was firmly countered in the late 1950's by a new policy of developing agriculture as the 'foundation' of the Chinese economy, with the commune as its basic unit. The commune provides a variety of jobs, social services, education and cultural life. It offers the first real alternative to the usual pattern of industrialization."

Scheme II

Being artists, the authors of this book are naturally partial to the middle mode of thinking. Scheme II, where the producing and the product are of a piece and every part of life has value in itself as both means and end; where there is a community tradition of style that allows for great and refined work, and each man has a chance to enhance the community style and transform it.

Such a commune is utopian. it is in the child-heart of man, and therefore it is easiest to think of it as growing in virgin territory with new people.

If we think of the underdeveloped regions that are sparsely settled and rich in resources, parts of Siberia, Alaska or Africa, the Columbia River Basin or parts of South America, self-sufficient regionalism on a quality standard makes sense. Such regions could be most harmoniously developed not by importing into them the total pattern of advanced technology (as is being done), but by the kind of industrial-agricultural symbiosis we have described, drawing always on their own resources and working them up themselves. If the old total pattern is simply reproduced in the new place, the first stage of a virgin area will be a colonial dependency, exporting raw materials; the final stage will be a merging into the national whole with no new cultural contribution. But we need the new contribution. On the other hand, the quicker and more harmoniously the new place achieves a regional self-sufficiency, the more independently and selectively it can cope with the complex national culture on its own terms, and the more characteristic its own contribution can be. A fresh region represents nature full of the possibilities of invention; an established economy is necessarily in the strait jacket of bad habits.

Source: P. & P. Goodman (1963)

I have already remarked on several occasions that the main reason why my agricultural worker informants accepted a communal farm was their expectation of material progress for themselves. The economic success of a peasant organization is chiefly important because on it depends the acceptance of the organization by the members and their solidarity. When I asked the small peasant farmers whether they would be prepared to co-operate in the communal exploitation of a fundo if invited, their affirmative answer was very often couched in terms of self-interest: 'That way at least I'd have something of my own', 'that would mean more land', 'we'd get more credit', 'it would be the only way to get some capital', or 'yes, for we'll turn them into individual farms'.

Identity of interests is also clear where the possibility of individual progress is lacking. INDAP personnel repeatedly noticed that the small, independent peasants appeared more inclined towards co-operation in the isolated areas of a province where natural circumstances were less favourable than in the areas close to the large cities. There also seemed to be a greater inclination towards co-operation on farms where (part of) the production process displayed the character of indivisibility, that is to say, *had* to be achieved through co-operation. Source: Galjart B. (1976).

In agriculture, as in everything else, associated labour is the only reasonable solution. Two hundred families of 5 persons each, owning 5 acres per family, having no common ties between the families, and compelled to find their living, each family on its 5 acres, almost certainly would be an economical failure. Even leaving aside all *personal* difficulties resulting from different education and tastes and from the want of knowledge as to what has to be done with the land, and admitting for the sake of argument that these causes do not interfere, the experiment would end in a failure, merely for *economical*, for *agricultural* reasons. Whatever improvement upon the present conditions such an organisation might be, that improvement would not last; it would have to undergo a further transformation or disappear.

But the same 200 families, if they consider themselves, say, as tenants of the nation, and treat the 1,000 acres as a common tenancy—again leaving aside the *personal* conditions—would have, economically speaking, from the point of view of the agriculturist, every chance of succeeding, if they know what is the best use to make of that land.

In such case they probably would first of all associate for permanently improving the land which is in need of immediate improvement, and would consider it necessary to improve more of it every year, until they had brought it all into a perfect condition. On an area of 340 acres they could most easily grow all the cereals—wheat, oats, etc.—required for both the thousand inhabitants and their livestock, without resorting for that purpose to replanted or planted cereals. They could grow on 400 acres, properly cultivated, and irrigated if necessary and possible, all the green crops and fodder required to keep the 30 to 40 milch cows which would supply them with milk and butter, and, let us say, the 300 head of cattle required to supply them with meat. On 20 acres, two of which would be under glass, they would grow more vegetables, fruit and luxuries than they could consume. And supposing that half an acre of land is attached to each house for hobbies and amusement (poultry-keeping, or any fancy culture, flowers, and the like)—they would still have some 140 acres for all sorts of purposes: public gardens, squares, manufactures and so on. The labour that would be required for such an intensive culture would not be the hard labour of the serf or slave. It would be accessible to everyone, strong or weak, town bred or country born; it would also have many charms besides. And its total amount would be far smaller than the amount of labour which every thousand persons, taken from this or from any other nation, have now to spend in getting their present food, much smaller in quantity and of worse quality. I mean, of course, the technically necessary labour, without even considering the labour which we now have to give in order to maintain all our middlemen, armies, and the like. The amount of labour required to grow food under a rational culture is so small, indeed, that our hypothetical inhabitants would be led necessarily to employ their leisure in manufacturing, artistic, scientific, and other pursuits.

Source: Kropotkin P. (1974)

From the technical point of view there is no obstacle whatever for such an organisation being started tomorrow with full success. The obstacles against it are not in the imperfection of the agricultural art, or in the infertility of the soil, or in climate. They are entirely in our institutions, in our inheritances and survivals from the past – in the ‘Ghosts’ which oppress us. But to some extent they lie also – taking society as a whole – in our phenomenal ignorance. We, civilised men and women, know everything, we have settled opinions upon everything, we take an interest in everything. We only know nothing about whence the bread comes which we eat – even though we pretend to know something about that subject as well – we do not know how it is grown, what pains it costs to those who grow it, what is being done to reduce their pains, what sort of men those feeders of our grand selves are . . . we are more ignorant than savages in this respect, and we prevent our children from obtaining this sort of knowledge – even those of our children who would prefer it to the heaps of useless stuff with which they are crammed at school. Source: Kropotkin P. (1974)

EDITOR'S APPENDIX

There is a well-known passage in Marx's *German Ideology* in which he envisages the abolition of the division of labour in a Communist society where, since ‘nobody has one exclusive sphere of activity but each can become accomplished in any branch he wishes, production as a whole is regulated by society, thus making it possible for me to do one thing today and another tomorrow, to hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise after dinner. . . .’ Kropotkin too wanted the ‘moral and physical advantages which man would derive from dividing his work between the field and the workshop’. The nearest thing to Kropotkin's industrial villages are the Chinese communes. J. K. Galbraith stresses their significance for the countries of the Third World:

‘Hsu Hang Commune has 20,500 inhabitants and roughly 4,200 acres of land, all irrigated. This is no great amount of land – less than an irrigated acre per family. The crops are grain (2 crops of rice a year, plus 1 of wheat), cotton, hogs and a variety of factory enterprises. . . . The families we visited, in addition to private, tiny vegetable plots, also each had their personal pig. Then we went to the factories. These, including some we did not see, make elementary threshing machines, furniture, basket-ware, boxes, light bulbs, chemicals and steel pipe. The factories are small – at most a few dozen workers in those we saw – and there is not much attempt at line production. Men and women are mostly either making a whole item or a substantial component. Still, they are serious operations – not a show. The justification is not efficiency but the employment of labour that would otherwise have little to do – technically it is the Chinese answer to one of the greatest problems of rural Asia, that of recurrent and disguised unemployment.’³

Source: C. Ward (1974)

Kropotkin sought a society which combined labour-intensive agriculture and small-scale industry, both producing for local needs, in a decentralised pattern of settlement in which the division of labour had been replaced by the integration of brain-work and manual work, and he was optimistic enough to believe that trends current in his day were leading to this kind of society. His picture of the future appealed to his fellow-anarchists as the kind of economic structure which would suit a worker-controlled federation of self-governing workshops and rural communes. It appealed to the ideologists of decentralist planning like Howard, Geddes and Mumford. It appealed to the advocates of small-holdings: those who wanted to see a highly productive intensive horticulture provide a good living for a new kind of sophisticated peasantry.

If we were asked today to point to actual human societies which exemplify the ideas set out by Kropotkin in this book, we would have to admit that there are only three contemporary models, each riddled by contradictions which may rule them out for the reader. The first, as I have indicated, is China. The difficulty here is not the credibility of the travellers' tales brought back by Western visitors, but the knowledge that some great shift in policy might put into reverse the trends which, at a distance, we admire. As George Orwell remarked of Stalin's Russia, it is like the family who all slept in one bed: when father turns, we all turn. Nevertheless, the stress on decentralist economic policy in China has been a consistent theme at least since 1956.

The second in Tanzania. No one who has followed the evolution of Julius Nyerere's ideas can fail to see their relevance and their resemblance to those of Kropotkin. But Nyerere's problem, like that of any political leader, is that of staying in power, and his country's ruling élite may have quite different ambitions. They know all too well how European-style development benefits the people at the top. One can only hope that Nyerere succeeds in implanting a style of thinking about economic and social priorities which will slowly permeate the African nations.

A third model is the kibbutz. In citing the Jewish collective settlements as an exemplification of Kropotkin's ideal commune, several qualifications have to be made. Firstly, of course, that they involve a small proportion of the population. Secondly, that the various *kibbutzim*, *kvutzot* and *moshavim* represent a variety of different ideologies. Thirdly, that we have to consider them without reference to the functions they have performed in the last decades in the service of Israeli nationalism and imperialism. Many of them are very much older than the state, and many of their pioneers were opposed to the idea of a State of Israel, and in fact urged their Arab neighbours to set up similar collectives. It is well over fifty years since Martin Buber warned his fellow Zionists that if the Jews in Palestine did not live *with* the Arabs as well as *next* to them, they would find themselves living in enmity to them. Buber devoted his book, *Paths in Utopia*, to a vindication of the ideas of the 'utopian' socialists, including the anarchist legacy of Proudhon, Kropotkin, and his friend Gustav Landauer, seeing their apotheosis in the *kibbutz* as 'an experiment that did not fail', and pointing to the significance of *Fields, Factories and Workshops*. In his view, Kropotkin

'makes, on purely economic and industrial-psychological grounds, a weighty contribution to the picture of a new social unit fitted to serve as a cell for the formation of a new society in the midst of the old. . . . He sketches the picture of a village based on field and factory alike, where the *same* people work in the one as in the other alternately without this in any way entailing a technological regress, rather in close association with technical developments and yet in such a way that man enters into his rights as a human being. Kropotkin knows that such an alteration cannot be 'completely carried through' in a society like ours, nevertheless he plans not merely for tomorrow but for today as well.'¹

Source: C. Ward (1974)

5.0

MISCELLAN-

EOUS

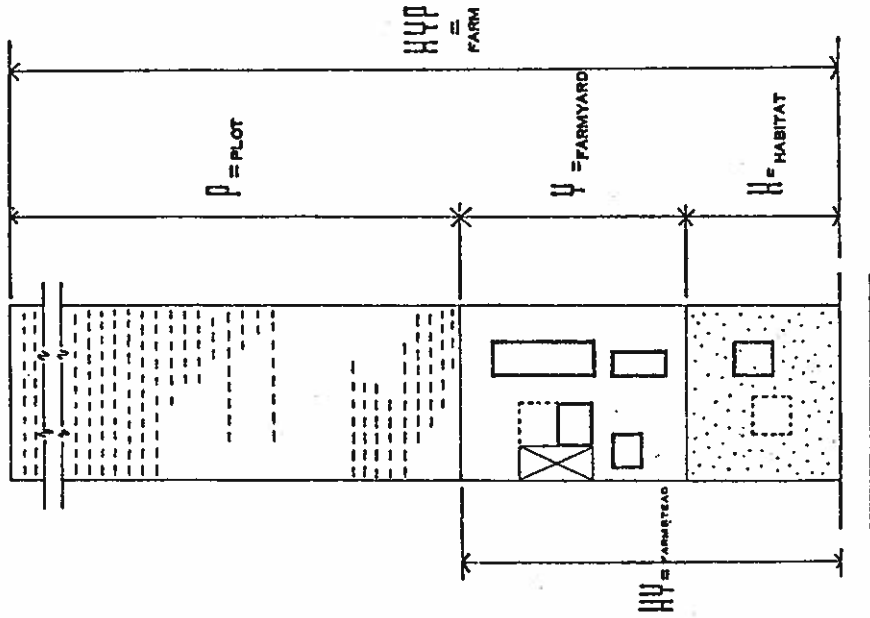
CLASSIFICATION OF SETTLEMENT PATTERNS - Rehovot

BY E. YALAN

In order to clarify the structure of the different types of agricultural settlements, a formula-like definition is given herewith which classifies the settlements in accordance with their different physical forms.

These definitions are based on the basic components of the settlements :

- H Farmer's Habitat
- ch Collective Habitat
- Y Farmyard

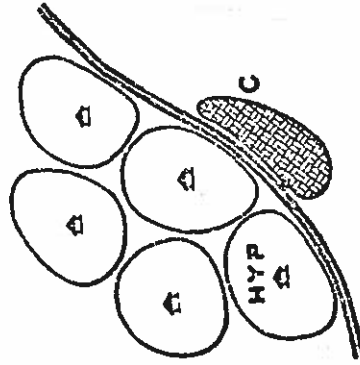


DRAWING 1. SCHEMATIC DRAWING OF THE FARM, PARTS INTO WHICH IT IS DIVIDED AND THEIR DENOMINATIONS

- P Agricultural Plot
- nP Number of Plots
- bP Agricultural Plot in a Block
- nbP Number of Block Plots
- C Settlement Services Centre
- mC Multi-Unit Services Centre
- HY Farmstead : Habitat attached to Farmyard
- HYP The Agricultural Farm including : Habitat, Farmyard and Agricultural Plot (see Drawing 1)

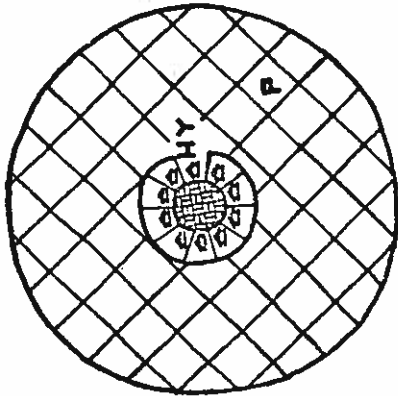
Village An agricultural settlement of whatever form.

SCATTERED AGRICULTURAL SETTLEMENT. This kind of settlement is composed of scattered farms. Each contains the agricultural plot as well as the farmstead, and depends for services on a distant centre. In accordance with the above terms of classification, the formula for this kind of settlement will be (HYP)+C, which means that the farmstead and the agricultural plot together form the farm. On the other hand, the service centre is not attached to the farms and therefore appears as a separate unit (Drawing 2).



Drawing 2: Scattered Agricultural Settlement

GATHERED AGRICULTURAL SETTLEMENT. The farmers' living quarters are located in the proximity of the service centre of the village — a form of gathered settlement popular in Spain, Italy and Latin America. The farmers' dwellings and the farmyards (farmsteads) surround the centre, while the agricultural plot is separated from them, as, for example, in the development of the Badajoz region in Spain (Drawing 3).



Drawing 3: A village in the Badajoz region, Spain.

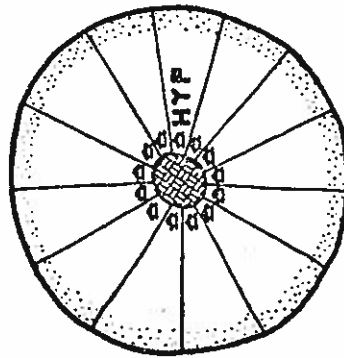
The different forms of Gathered Settlement common in Israel are:

The traditional unplanned village (H + Y + nP)C

The Moshava, earliest form of planned settlement (H Y P + nP)C

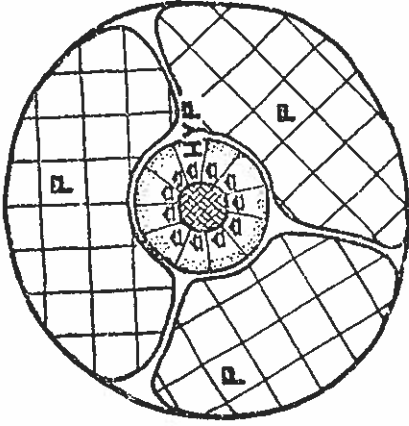
The Moshav (cooperative settlement) in its different forms:

- a. A Moshav, where the entire individual agricultural plot is attached to the farmstead, and all are clustered around the service centre (H Y P)C (Drawing 4).



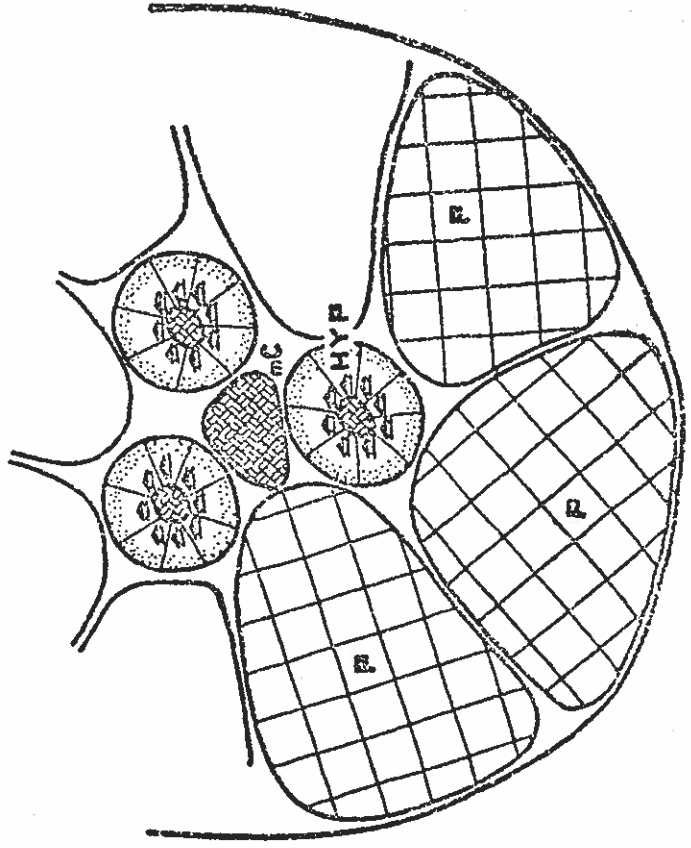
Drawing 4: A Moshav where the agricultural plot is attached to the farmstead and to the house

- b. A Moshav, where only a small part of the plot is attached to the farmstead and clustered around the service centre, while the major parts of the farmers' plots (more than one for each) are located in big blocks according to specific branches of cultivation (H Y P + n b P)C (Drawing 5).



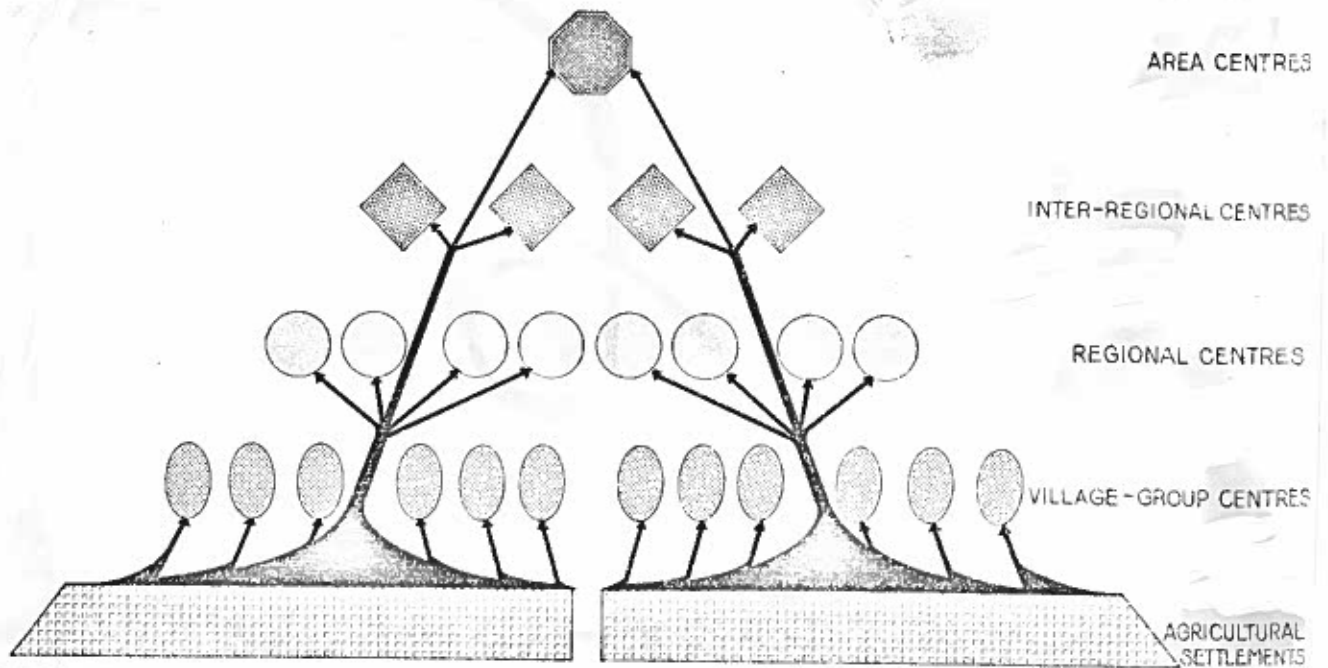
Drawing 5: A small agricultural plot attached to the farmstead. The remaining plots are within large blocks

- c. Multi-Unit Moshav, in the centre of which most of the village's services are located. The farmsteads with small agricultural plots attached to them are located around the neighbourhood centre, while the remaining agricultural plots are grouped in large blocks of specific branches of cultivation (H Y P + n b P)mC (Drawing 6).



Drawing 6: A Multi-Unit Settlement

FORMATION OF THE SYSTEM OF RURAL CENTRES



Source: Rehovot Settlement Study Centre, Israel, (1969).

THE EVOLUTION OF COMPOSITE RURAL CENTRES

LEGEND

- COMMUNITY ORGANIZATION
- VILLAGE-GROUP ORGANIZATION
- REGIONAL ORGANIZATION
- INTER-REGIONAL ORGANIZATION
- AREA ORGANIZATION
- COMMUNITY CENTRE
- VILLAGE-GROUP CENTRE
- REGIONAL CENTRE
- INTER-REGIONAL CENTRE
- AREA CENTRE

THE SETTLEMENTS' RELATIONSHIPS WITH RURAL CENTRES

COURSE OF EVOLUTION	THE EVOLVED COMPOSITE CENTRE	THE EVOLVED RURAL SYSTEM
A		
B		
C		
D		
E		SEE FIG. TOP OF PAGE

Comparison of Macro-Physical Infrastructural Projects with Micro-Physical Infrastructural Projects. Source: Rural Centre Planning (1978).

In the case of a macro watersupply system we see the following possibilities for structuring the social-economic development process and the different fases:

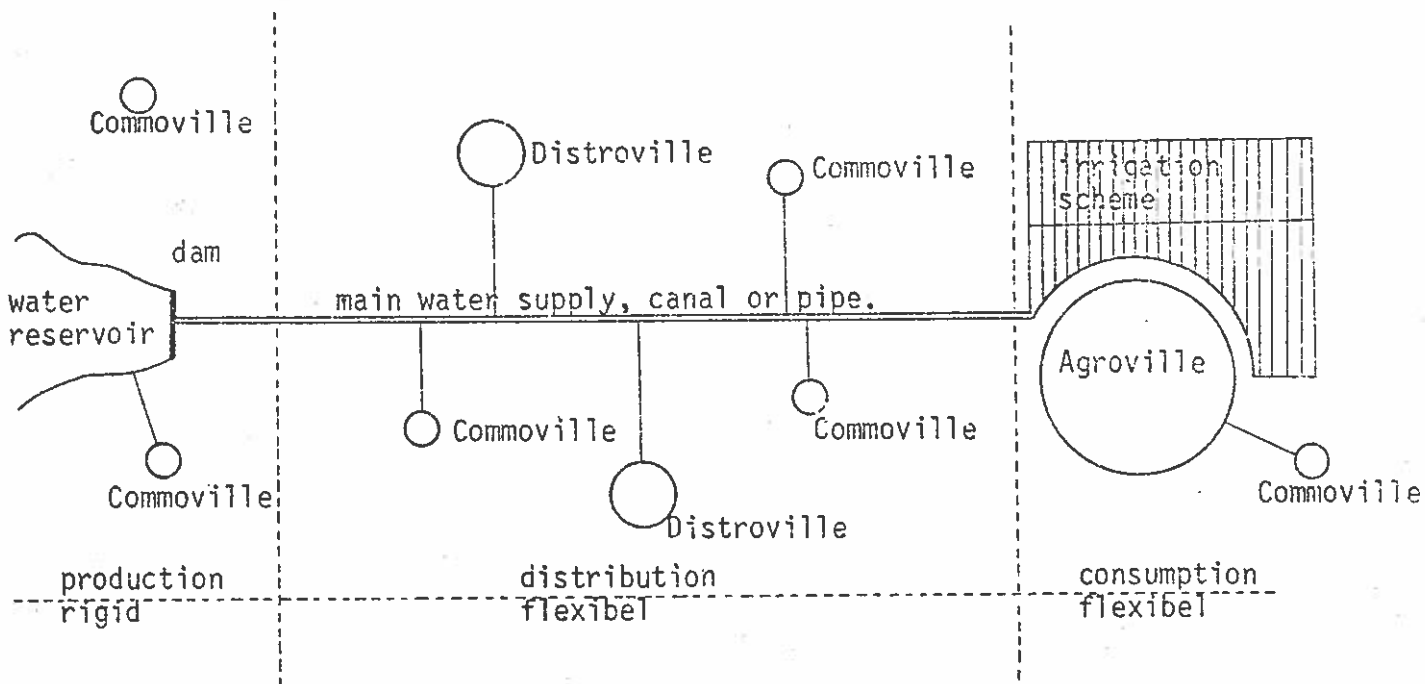


Fig. 4.16.

- phase 1:- Building of dam. (taking of treshold 1)
 phase 2:- Construction of pipeline or canal to the basic economical activity, e.g. Agrovillage or Indoville. (treshold 2)
 phase 3:- Construction of pipelines or canals to e.g. Distrovilles of Commovilles. (treshold 3)

The engineering works undertaken in phase 1 and 2, can be done in a modern capital intensive way as to reach optimum results in a short time. In particular cases we need to study the possibilities for aided self-help and labour intensive technologies, e.g. construction of the dam and/or canal.

The engineering works undertaken in phase 3, can be done in a labour intensive way as to give optimum social-economical result for the rural poor as it creates employment possibilities. Maintenance need to be part of the development scheme and is preferably executed by the local people.

The costs of constructing the dam, water supply canal or pipe and consumption elements (irrigation network) in the bigger centres (Agrovilles), are considered seperately from the connection networks to the rural areas. (Distrovilles, Commovilles). The economic productive elements in the Agrovillage and/or Indoville are charged for the costs of building dam, canal or pipe and consumption network. The traditional agricultural sector in the Distroville, will only be charged for the construction of the connecting pipe or canal from the Distroville towards the main water pipe or canal.

This can be paid by working on the construction of the connecting pipe or canal. (labour intensive self-help projects).

The non-basic economic elements are directly financed by the basic economic elements. Basic as well as non-basic economic development can only take place after construction of the dam and the main water pipe or canal. These are thresholds that need to be taken first before development takes place.

Secondly, considering the micro-physical infrastructure projects, the structuring and phasing is of a different nature than the macro-infrastructure projects as their structuring influence is restricted to a smaller region (micro-region). Micro-infrastructure projects are more flexible^{THAN} macro-infrastructure projects, the construction is cheaper and easier to construct and to maintain by local unskilled labour. Micro-infrastructure elements do have a basic economic function on micro regional level. Tertiary roads can be used as connection of the farm to market roads to stimulate agricultural development.

The phasing of these projects need to be done in accordance with the development of the particular micro-region concerned, connections with e.g. secondary roads will take place only after the construction of the road is motivated by the economic and social interest of the people in the rural centre (Distroville, Commoville).

To say it in other words:

"We don't build a road for the man from the city to come to us and by our products to sell them in the urban areas. No, we built the road to transport our goods ourself to the markets in the urban areas".

For this to happen community development is necessary next to the establishment of agricultural coöperatives.

Community development is an instrument to make people aware of the possibilities which infrastructure projects will offer them towards social-economic development.

In the case of micro-watersupply systems we see the following possibilities for structuring the social-economic development proces. Small wells and dams are constructed near each Commoville, Distroville and/or Agroville.

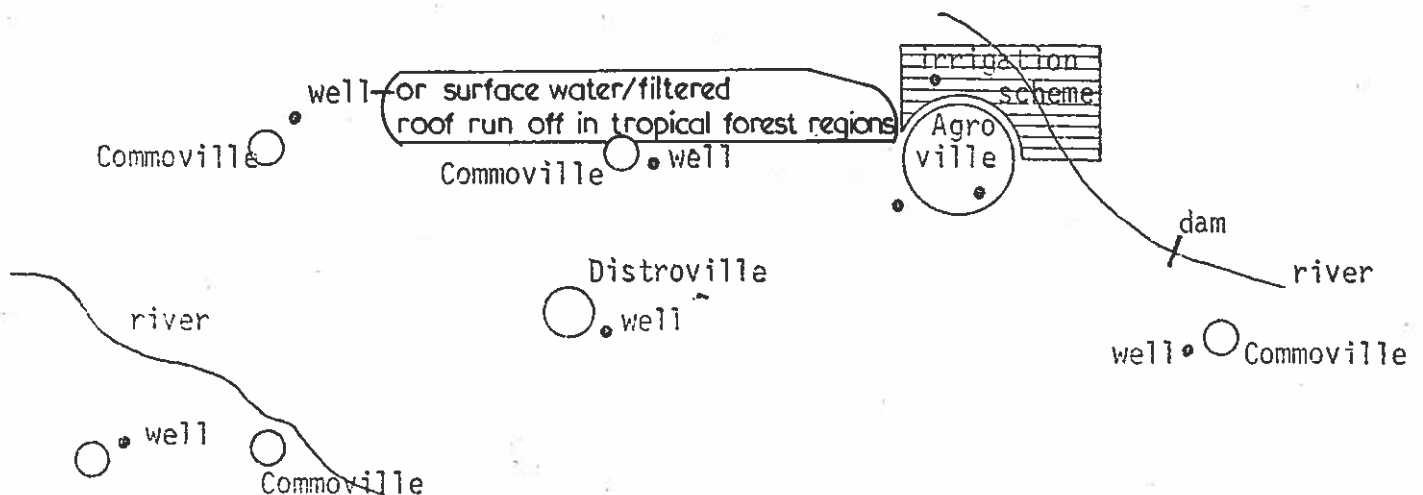


Fig. 4.17.

This results in a situation whereby each centre has its own watersupply system and becomes less dependent.

The construction of wells and small dams are good possibilities for aided-self-help and/or self-help schemes.

Maintenance can be done by the people themselves, and preferably by the people who did construct the well.

Each centre can start to build his well and/or dam when they want and when time, money, know-how, materials and labour are available.

Summary.Introduction:

This report is a preliminary report on the Fourth General Census of Population, held in January 1972 in Surinam. The time-reference period for this Census is December 31 st, 1971.

In order to obtain a distribution of the population by place of usual residence it was necessary to allocate those, who were enumerated elsewhere, to the geographic area in which they normally reside. This, however, proved to be too time-consuming, so that the number of usual residents who were temporarily absent from each district had to be estimated. Considering that the data herein are not expected to differ from the final figures by more than 2%, the presentation of this report is believed to be fully worthwhile.

Main results:

The preliminary returns of the 4th General Population Census show that on December 31st, 1971, the population of Suriname numbered about 384.900 persons. The three preceding censuses set the population figure at 328.400 persons in 1964, 184.700 in 1950 and 109.000 persons in 1921.

Table 2 (on page 3) shows the population to be concentrated in the districts of Paramaribo (the capital city of Surinam) and Suriname; the residents of these two districts accounted for about 66% of the total population. Whereas Paramaribo shelters a decreasing portion (39.4% in 1922 against 26.6% in 1971) of the population, the reverse is true for the district of Suriname. The growth of this district can be attributed mainly to the movement of people from the rural areas to the areas in the district of Suriname, which surround the capital city. Migration from the rural districts has not been directed primarily to the city proper, but to the areas surrounding it.

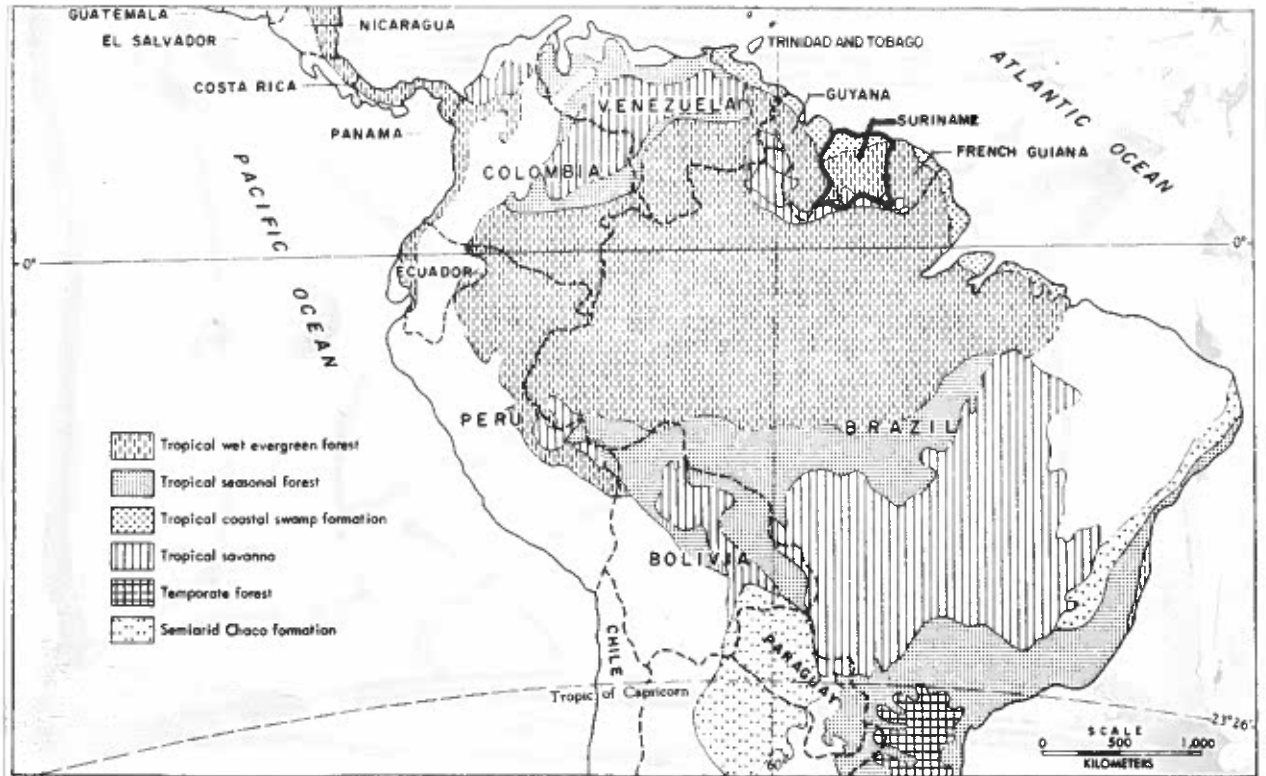
Of the three ethnical groups, the Hindustanis numbered 142.300 in 1971 (1963: 111.400), the Creoles 118.500 (1963: 113.900) and the Indonesians 58.900 (1963: 48.000) persons. Neither the total population nor the different ethnical groups have shown a constant rate of growth over the years. The number of Hindustanis e.g. increased between the first and the second census (1921 / 1950) by 2.55% per annum, while between the second and the third (1951 / 1964) and between the third and the fourth (1964 / 1971) their annual increase amounted to 4.34% and 3.10% respectively. For the Creoles and the Indonesians these percentages amounted to respectively 1.03%, 3.25%, 0.50% and 2.67%, 2.21% and 2.59%. Total population increased by 1.73%, 4.34% and 2.30% annually (Graph I).

In 1971 Surinam had a sex ratio of 999 females per 1000 males. The figures for 1921, 1950 and 1963 are 912, 1008 and 1001 respectively (Table 4 on page 7).

The age composition of the population (table 5 on page 8) shows that boys and girls under 15, together numbering about 175.700, constituted 45.7% of the population. The provisional figures for 1971 indicated that, whereas from 1921 (33.0%) to 1963 (47.6%) there was a steady increase in the proportion of the population in the younger ages, from 1963 to 1971 this proportion fell from 47.6% to 45.7%.

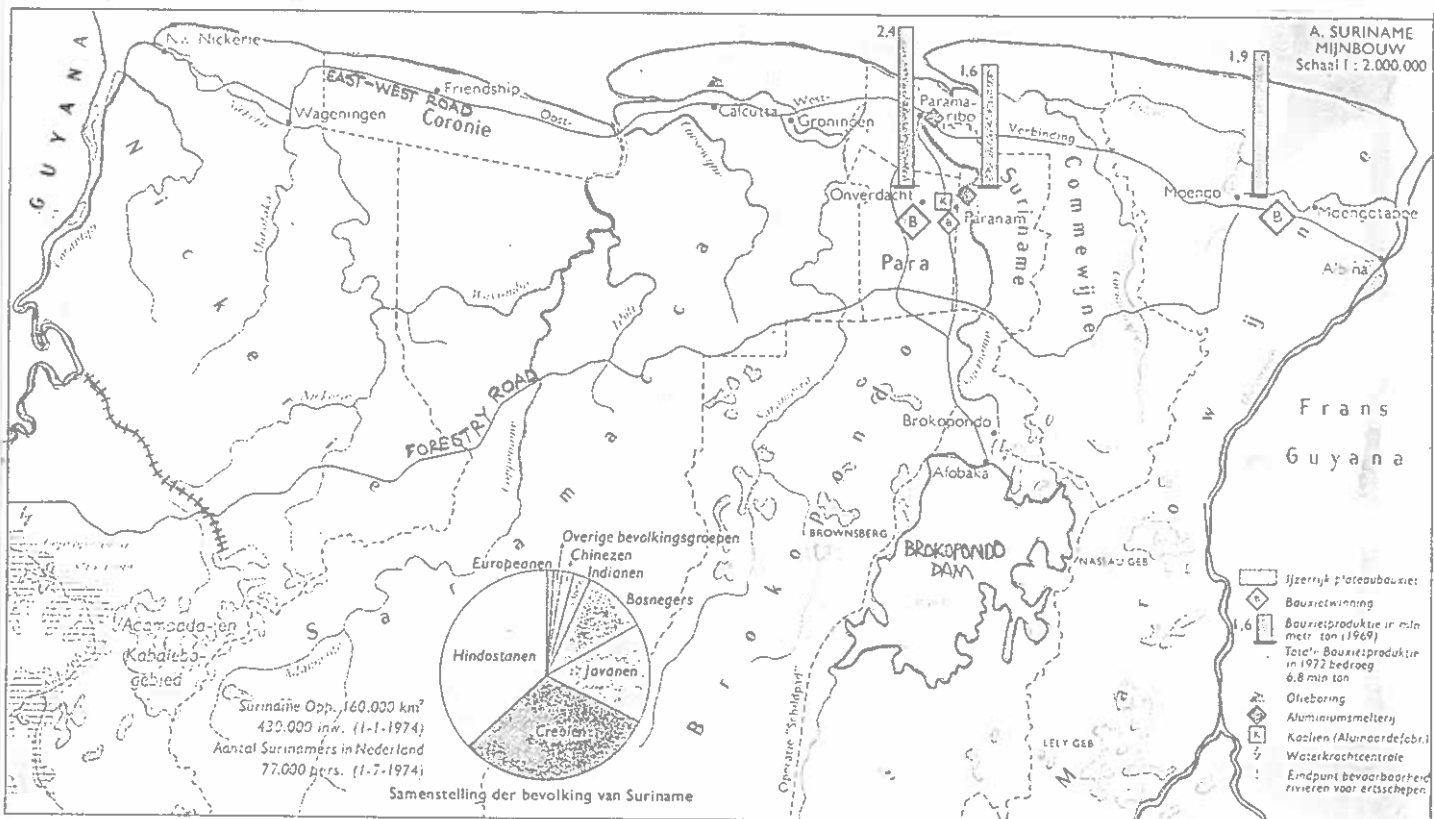
The main cause of the decrease in the annual rate of growth (from 4.34% during 1950 / 1964 to 2.30% during 1964 / 1971) lies mainly in the severe emigration to primarily the Netherlands, which started about 1963. It is estimated that Surinam lost a total of 62.700 persons by out-migration. It is furthermore estimated that in the year 1980 the Surinam population will number between 478.600 and 616.000 persons, while in the year 2000 the population figure will lie between 758.600 and 1.076.000 persons.

Source: Algemene Bureau v/d Statistiek: Suriname
Fourth General Population Census 1971



Vegetation regions in the humid tropics of Latin America. Source: Nelson (1973)

SURINAME



Source: De Grote Bosatlas 1976

De tegenstelling tussen kleine landbouw en grote landbouw, zoals de aanduiding in Suriname luidt, is in Suriname vanouds aanwezig. De ondernemingslandbouw, gericht op produkten voor de wereldmarkt, is de direkte erfgenaam van de plantagelandbouw. De kleine landbouw, gericht op de voedingsgewassen, is primair een aangelegenheid van de Hindoestaanse kleine boeren. Verschoof het gewicht in de agrarische sektor tussen de twee wereldoorlogen naar de kleine landbouw, in de jaren zestig ontwikkelt zich de grote landbouw meer en meer, terwijl de bevolkingslandbouw stagneert.

Hiervoor zijn twee redenen. In de eerste plaats is de ontwikkeling van Suriname primair gezien als een kwestie van investeringsstrategie. Het is duidelijk dat wie over relatief grote sommen beschikt, deze gemakkelijker in enkele grote projekten besteedt, waarvan de technische en economische aspecten te overzien en te berekenen zijn. De grote landbouw heeft in Suriname nooit kunnen bloeien doordat zij de benodigde arbeidskrachten geen behoorlijk bestaan kon bieden. Dit probleem is nu echter te overwinnen door te kiezen voor grote, kapitaalintensieve, gemechaniseerde bedrijven. De tweede reden is van sociaal-kulturele aard. De kleine boer in zijn afgelegen distrikt neemt in de Surinaamse samenleving de laagste plaats in. De kleine boeren die naar verbetering van hun lot streven doen dit dan ook door de landbouw te verlaten. Een verbetering van de produktiemethoden en levensomstandigheden van de kleine landbouwers is technisch moeilijk. Men heeft dan te maken met duizenden kleine en zeer kleine boeren van vaak geringe ontwikkeling die organisatorisch bij koöperatieve bewegingen, technische cursussen etc. betrokken moeten worden en het kapitaal moet in vele kleine delen worden besteed. Maar deze technische moeilijkheden hadden wellicht overwonnen kunnen worden als het sociaal mogelijk was geweest zich hierop te concentreren.

De Surinaamse landbouw wordt beheerst door vier gewassen, namelijk rijst, bacove, suiker en citrus. Deze maakten in 1970 86% van de produktiewaarde en 84% van de exportwaarde van de agrarische sektor uit. Bij deze vier produkten is er alleen in het geval van de rijst sprake van een belangrijke bijdrage van de kleine landbouw. Het is dit voedingsgewas waarop de kleine landbouw in Suriname zich in eerste instantie richt. Toch is ook bij de rijstproduktie de grote gemechaniseerde landbouw overheersend geworden. Van het totale rijstareaal van 37.409 ha in 1972 was niet meer dan 17.000 ha in handen van kleine boeren. De Stichting Machinale Landbouw zorgde alleen al voor 44% van de totale rijstproduktie.

Ondanks de opmars van de grote landbouw vertoont de landbouw als geheel geen stijging.

Source: van Amersfoort 1975

Produktie en produktiewaarde van de landbouw

	Beplante oppervlakte (ha)			Produktie (1000 kg)			Produktiewaarde (\$f 1000)		
	1970	1971	1972	1970	1971	1972	1970	1971	1972
Padi	39.132	40.153	37.409	145.399	136.290	122.968	16.766	14.724	14.480
Mais	129	126	140	192	319	350	48	126	151
Aardvruchten	338	387	360	1.945	2.382	2.296	442	680	825
Peulvruchten	540	367	344	490	364	317	356	344	516
Groenten	621	439	466	3.357	2.740	2.966	1.880	1.615	2.143
Bacove*	1.634	1.792	1.940	39.749	49.255	42.000	2.020	3.240	4.171
Bananen	397	160	151	2.895	1.980	1.922	782	594	692
Suiker**	2.291	2.200	2.143	186.621	150.800	168.552	4.609	3.890	4.362
Sinaasappels***	1.784	1.328	1.399	49.078	50.150	57.877	1.546	1.440	1.453
Grapefruit***	316	371	377	8.096	11.820	15.006	285	330	275
Overige citrus***	73	63	45	2.137	2.130	1.004	59	53	22
Kokos***	1.392	1.243	1.160	7.571	7.230	7.100	450	578	639
Cacao	511	428	412	86	74	58	88	87	67
Koffie	747	524	442	207	90	98	143	228	167

* Exklusief ontginnings- en kwekerijoppervlakten.
 ** Voor 1970, 1971 en 1972 Waterloo uitgevallen.
 *** Duizenden stuks.

Discussion with ir. J.F. Rijsdijk - TNO Delft 1/3/79

Mr J. Rijsdijk works at the Wood Institute of the TNO (Technische Natuurwetenschappelijk Onderzoek) at Delft - he studied tropical forestry and stayed in Indonesia before coming to Holland. Various aspects of tropical forestry were discussed and these are taken up in the following summary of our discussion.

A small forestry area i.e. owned by a services centre/small town is about 1 000 ha. Such an area would require 15 foresters working solely in the forestry area.

A state-owned forestry reserve usually is 2-5 000 ha. In tropical forest complete clearing of existing forest is unadvisable because of soil erosion and washing away of fertile soils by the rain. Strip cutting may be resorted to, in which alternate strips of forest are cleared and re-planted, thereby creating a permanent forestry area. Usually selective cutting of existing forest is applied. This process involves the following:

- 1) Trees of desired, similar species are located and mapped in a specific area.
- 2) A forestry track (cleared undergrowth) is constructed in the shortest route between all trees to be chopped.
- 3) Trees are chopped (e.g. with a chain saw) to fall in the direction of the forestry track. The felled tree is sawn into smaller logs.
- 4) A hauling system (e.g. tractor with cable) drags the logs to a centrally located saw mill, or to a transport route (e.g. railway) going to such a saw mill.
- 5) Logs are sawn down to planks, boards, blocks at the saw mill and sold directly or exported. A saw mill, which requires constant timber 'feeding', is usually centrally located to its forestry areas in a services centre/town from where the sawn timber may be easily transported. One saw mill requires a permanent labour force of 15-25 people, but the sawn timber could in turn provide labour for hundreds, - transporters, builders, carpenters, furniture makers, chips and paper manufacturers.

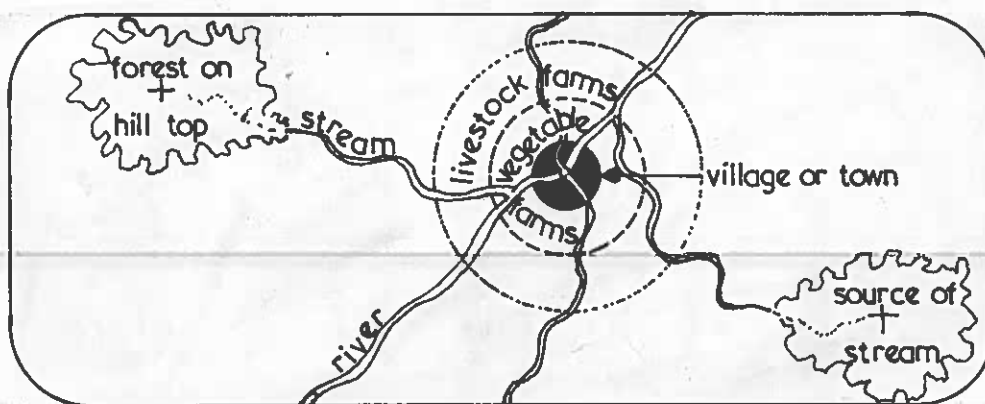
A permanent forestry area (strips) is a long term endeavour. Foresters may be employed for 2 years to cut and re-plant the forest, and at least another year to monitor the growth of the small trees. An optimum tree-thickness is 60-70 cm and this may be reached only after 20-30 years. However, a workable minimum is 25 cm, which could be reached in a ten year period. Selective cutting may be resorted to in this period to ensure constant labour. If selective cutting is applied, the total

elimination of one species should be avoided, as its seeds are lost, and it cannot be grown again.

Agri-forestry, being the interspersal of agriculture and forestry, is unfavourable as the trees soon make agriculture between them impossible. Instead the planting of fruit trees in agricultural areas is adviseable.

Any forest anywhere in the world always needs to be protected against theft, e.g. for fire wood and dwelling construction. Besides helping to resist soil erosion, forest on hills or watersheds help to regulate and maintain the source of rivulets, whose combined flow keeps streams and rivers supplied with water. It is therefore inadvisable to remove existing forest from such hills/watersheds.

Mr Rijsdijk pointed out that the landscape -usage he favours the most because of its balance in nature, is the following (as found in pre-industrial Europe):



Essential to the export of timber is continuity - every year x cubic metre of timber must be able to be exported to the off-set market. This continuity is economically favourable to both client and supplier. In a region like West-Suriname this would mean controlled selective cutting of the commercial tree species (Mora, Krappa). A pulp factory, be it in or outside Suriname, would require the timber for at least 60 000 ton pulp before it may be set up. Wood with long fibres produces the highest quality paper, but short fibre-wood may also be used, (Pinus Carribean). The introduction of foreign tree species to the region should be avoided because of a tree-disease risk.

Lastly, in Mr Rijsdijk's opinion fire barriers would be required in a rain forest only in those areas where people are constantly traversing the forest.

G.O

REGIONAL

PLAN STUDY

1, 2 AND 5

Regional Plan Study 1,2 and 3

The Proposed Regional Plan presented in the Main Report evolved from three Regional Plan Studies concentrating on the spatial settlement patterns in the railway zone. Plan Study 1 - dispersal, and Plan Study 2 - concentration, are taken up in the following tabel, their advantages/disadvantages being described and compared.

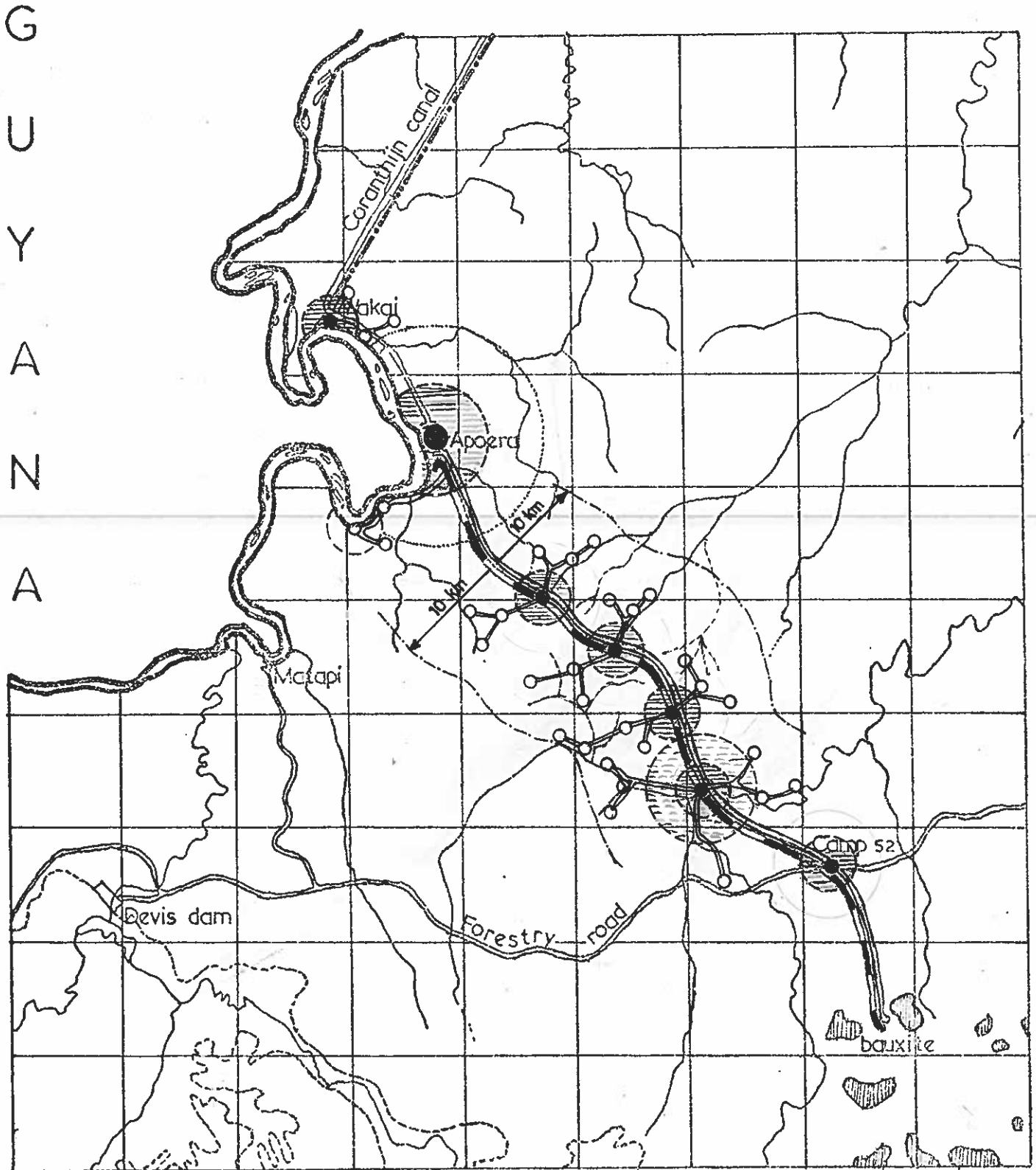
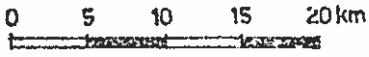
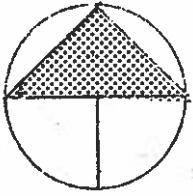
Study Characteristic	<u>Plan Study 1</u>	<u>Plan Study 2</u>
<u>Advantages</u>	<p><u>Selective cutting</u>: villages are centrally located in the forest</p> <p><u>Soil fertility</u>: settlements may locate on the most fertile soils on river banks.</p>	<p><u>Service road</u> can serve as rural link - limited road saving.</p> <p><u>Full utilization</u> of existing cleared area adjacent to railway line.(150 m on either side).</p>
<u>Disadvantages</u>	<p><u>Distance</u>: long distances to services centre make full use of latter impossible - travelling times/transport costs escalate.</p> <p><u>Villages isolated</u> in the forest are difficult to colonise with urbanised migrants.</p> <p><u>Lengthy</u> new rural road network makes implementation expensive/fragments forest structure.</p> <p><u>Flooding</u>: of villages/farm-land in low lying valleys too far away from watershed is possible.</p>	<p><u>Erosion</u> danger relatively great on ridge during heavy rains.</p> <p><u>Watershed</u>: soil comparatively infertile = agriculture difficult.</p> <p><u>Source</u> of rivulets/streams jeopardised as catchment area is affected - sensitive landscape.</p> <p><u>Railway</u> is inefficient when used back & forth between extremely short distances - settlements to/from rural services centre.</p>

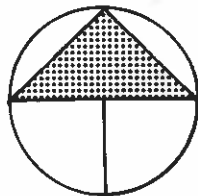
The plans which follow serve to visualize the two Plan Studies compared above, as well as Plan Study 3, which may be thought of as an 'in-between' proposal in terms of the two extremes represented by Plan Study 1 and 2.

70 WEST SURINAME

THE PROPOSED REGIONAL PLAN

STUDY 1 The Dispersed Pattern

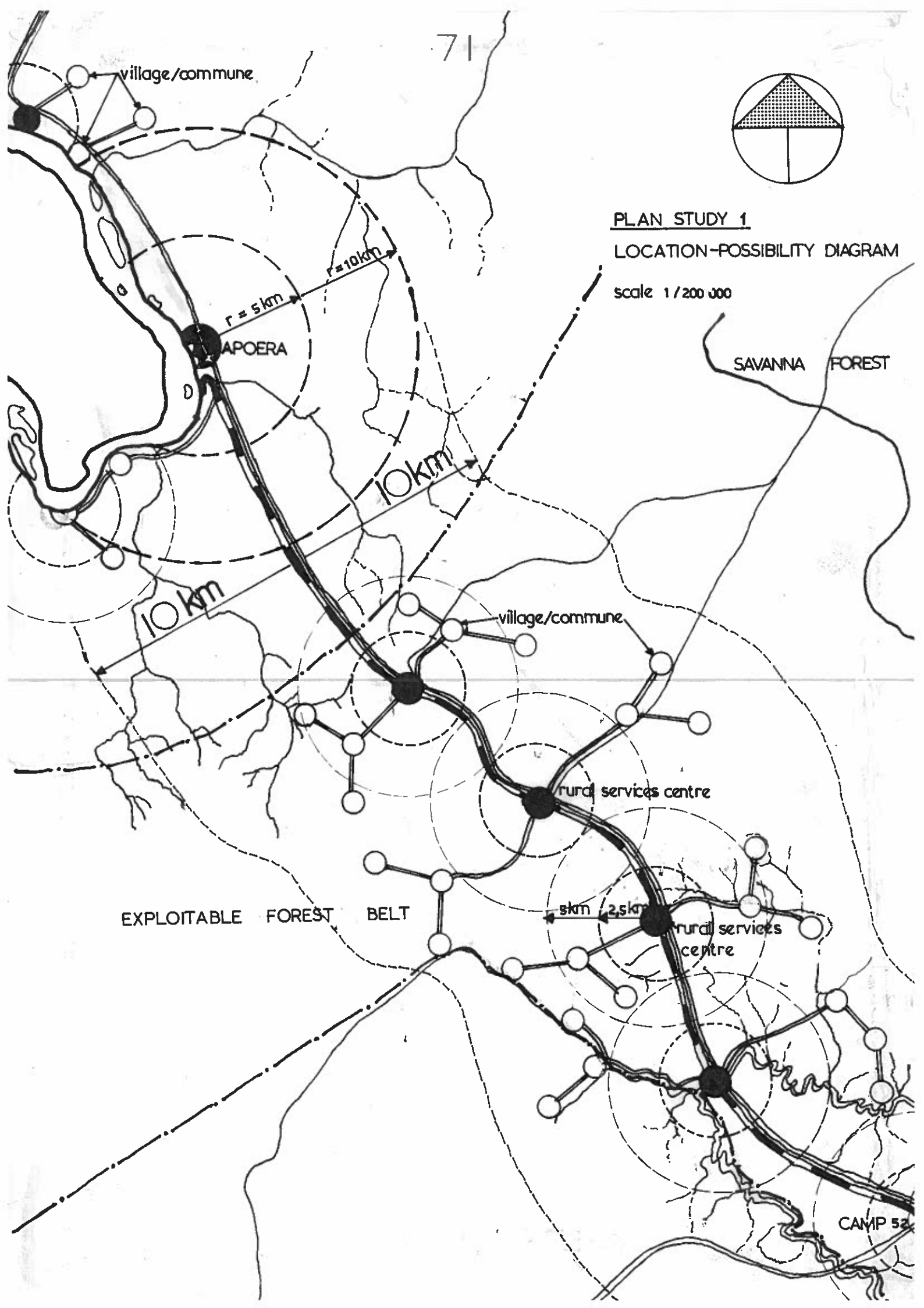




PLAN STUDY 1

LOCATION-POSSIBILITY DIAGRAM

scale 1 / 200 000



village/commune

APOERA

r ≈ 5 km

r ≈ 10 km

10 km

10 km

village/commune

rural services centre

EXPLOITABLE FOREST BELT

SAVANNA FOREST

5 km

2.5 km

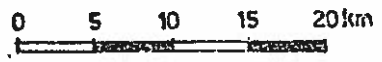
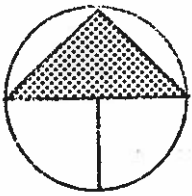
rural services centre

CAMP 52

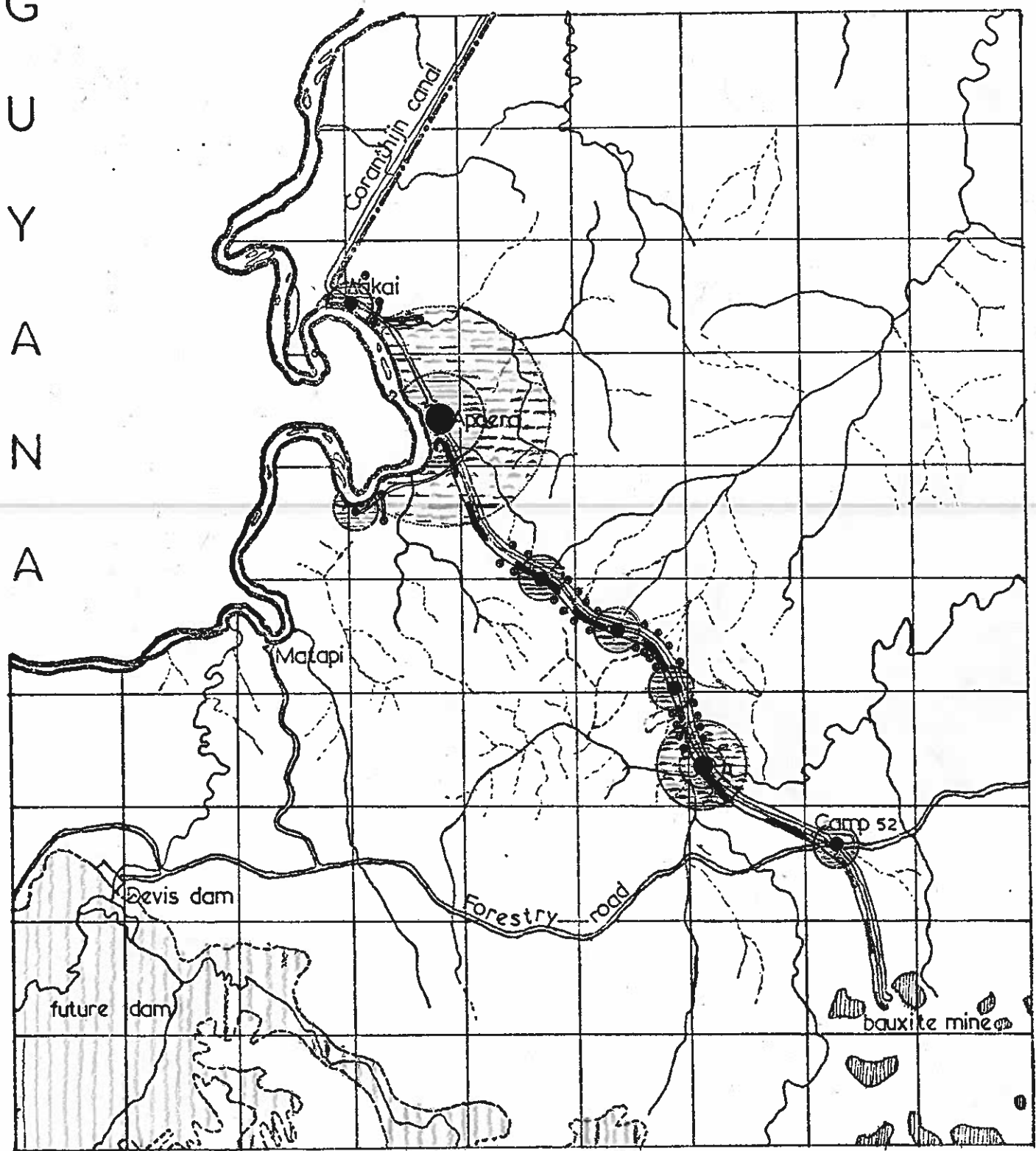
72
WEST SURINAME

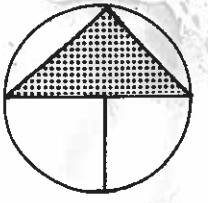
Proposed Regional Plan when complete

STUDY 2 The Concentrated Pattern

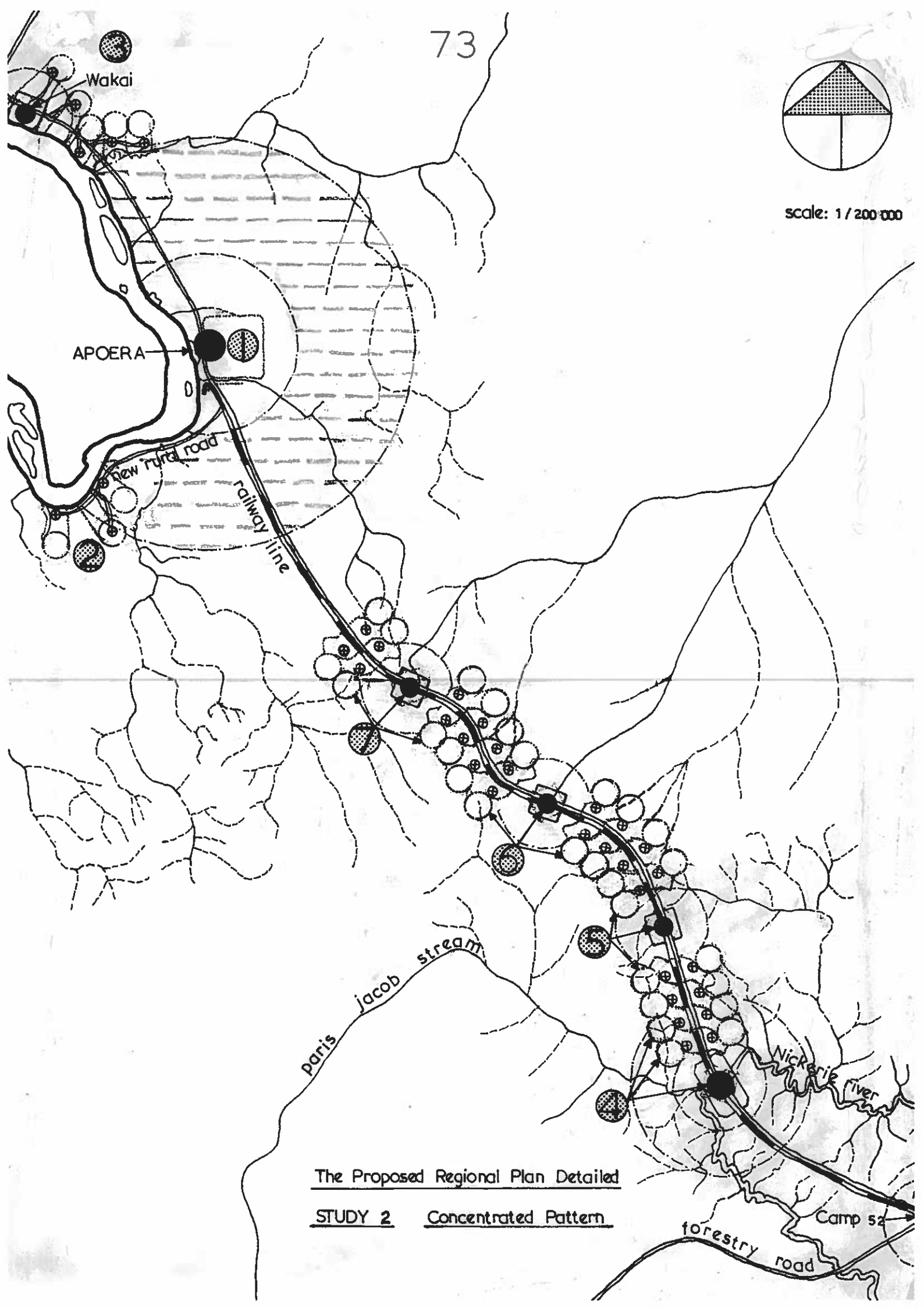


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scale: 1 / 200 000



APOERA

Wakai

new rural road

railway line

Paris jacob stream

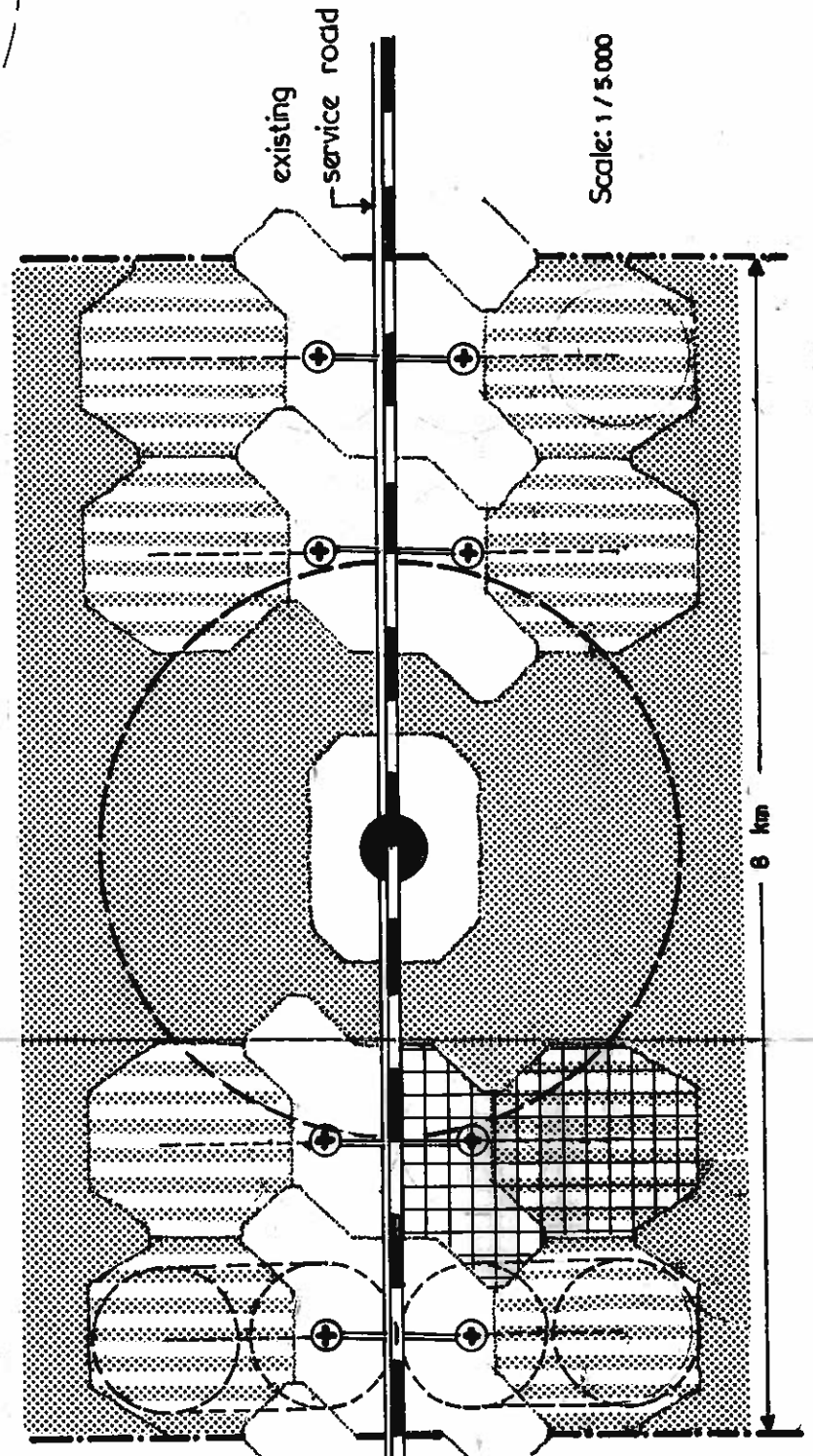
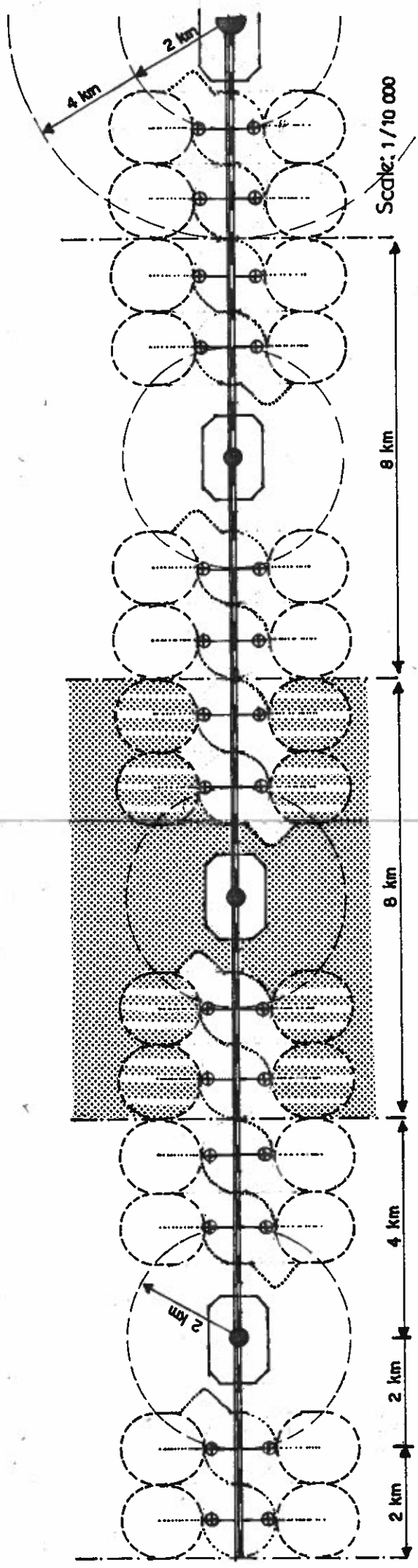
Nicksie river

Camp 52







forestry road

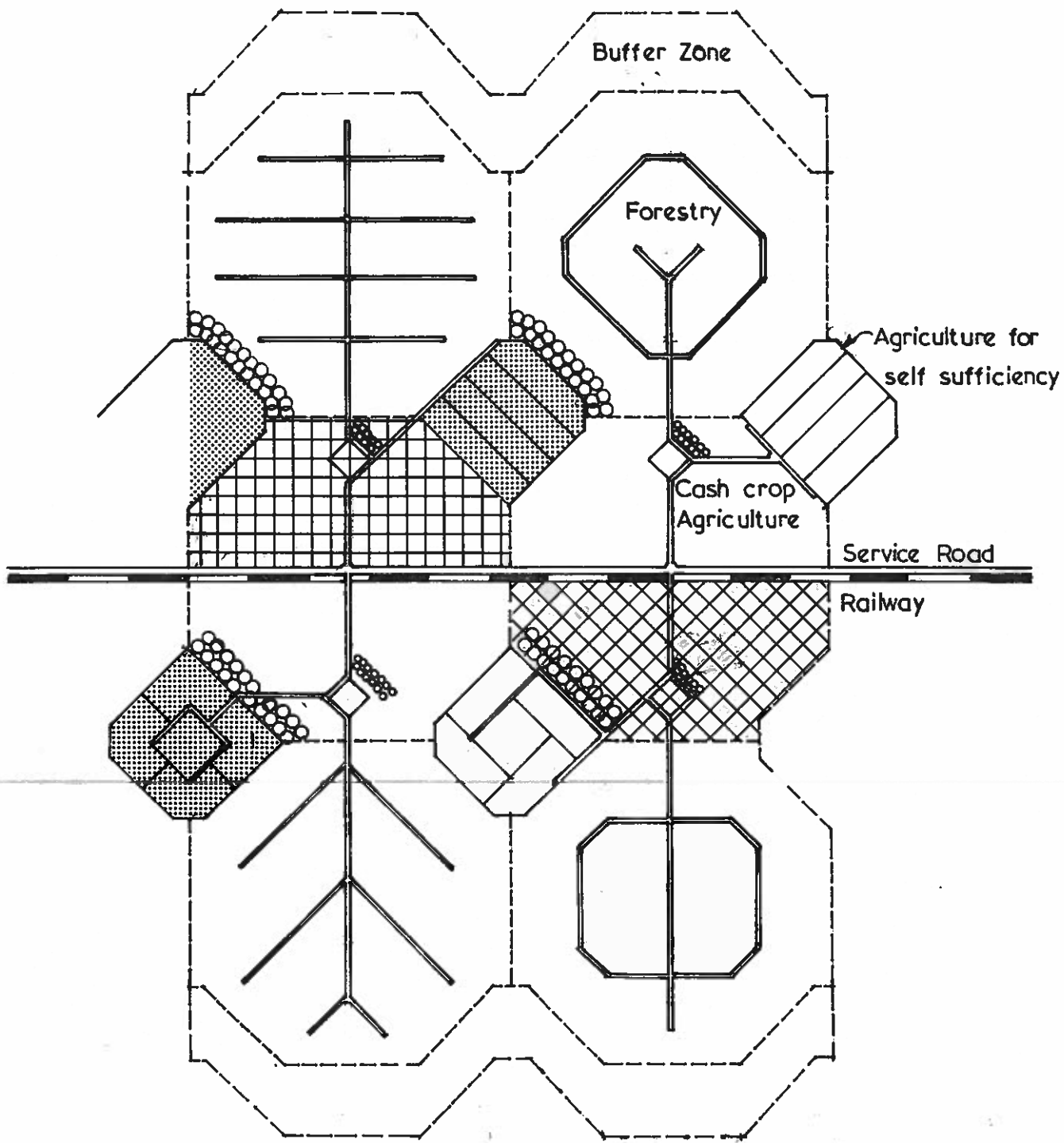
The Proposed Regional Plan Detailed

STUDY 2 Concentrated Pattern



LEGEND

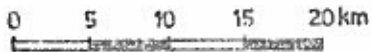
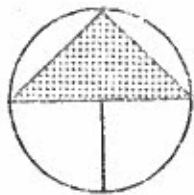
-  forestry—transitional
-  village/commune
-  services centre
-  existing railway
-  activity—area of one village
-  preserved rain forest to maintain structure of rain forest, also to prevent soil erosion



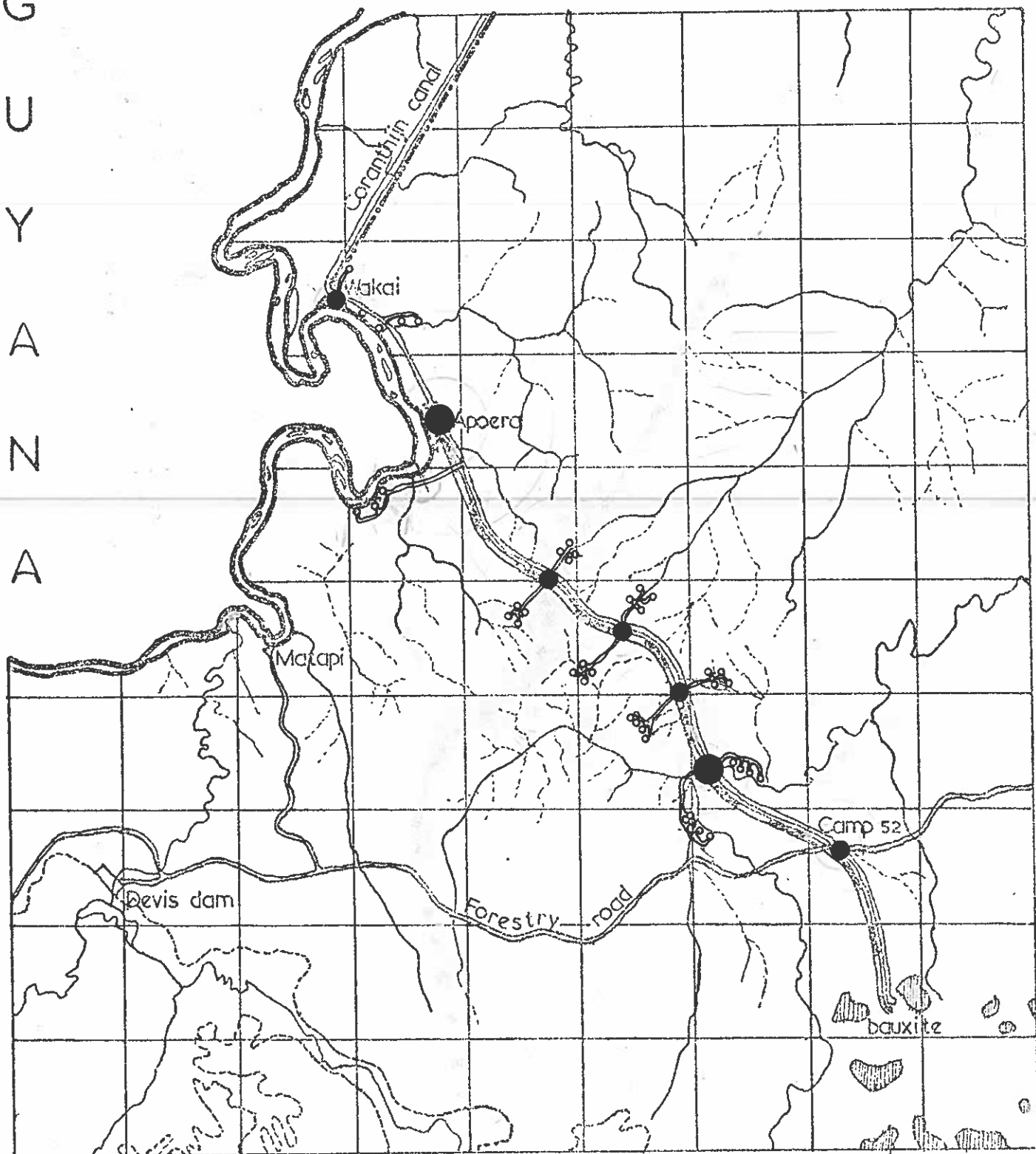
76 WEST SURINAME

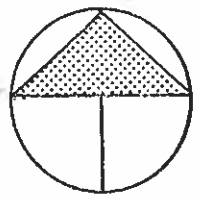
THE PROPOSED REGIONAL PLAN

PLAN STUDY 3 The In-Between Pattern



G
U
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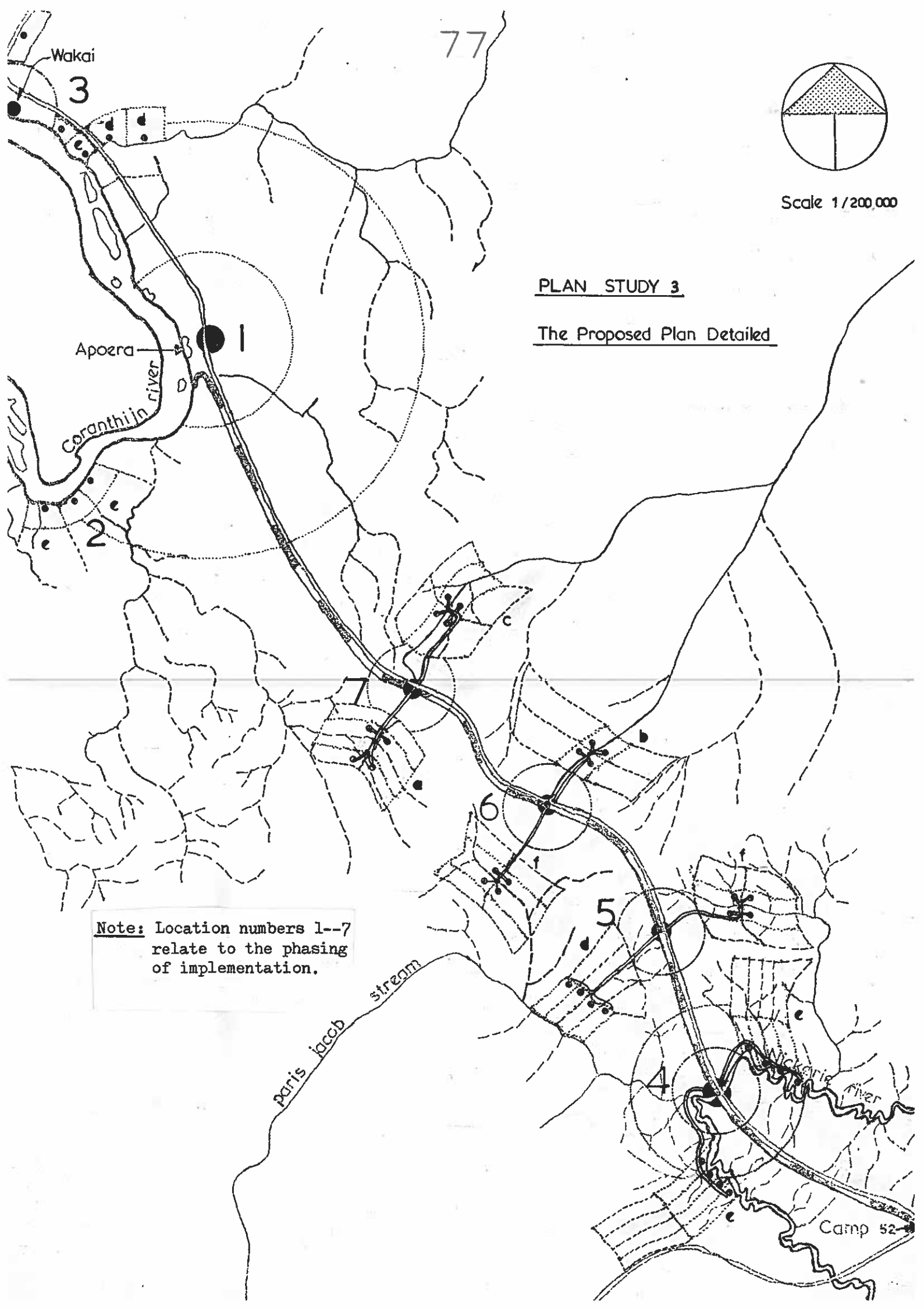




Scale 1/200,000

PLAN STUDY 3

The Proposed Plan Detailed



Wakai

3

Apozra

Coranthin river

2

6

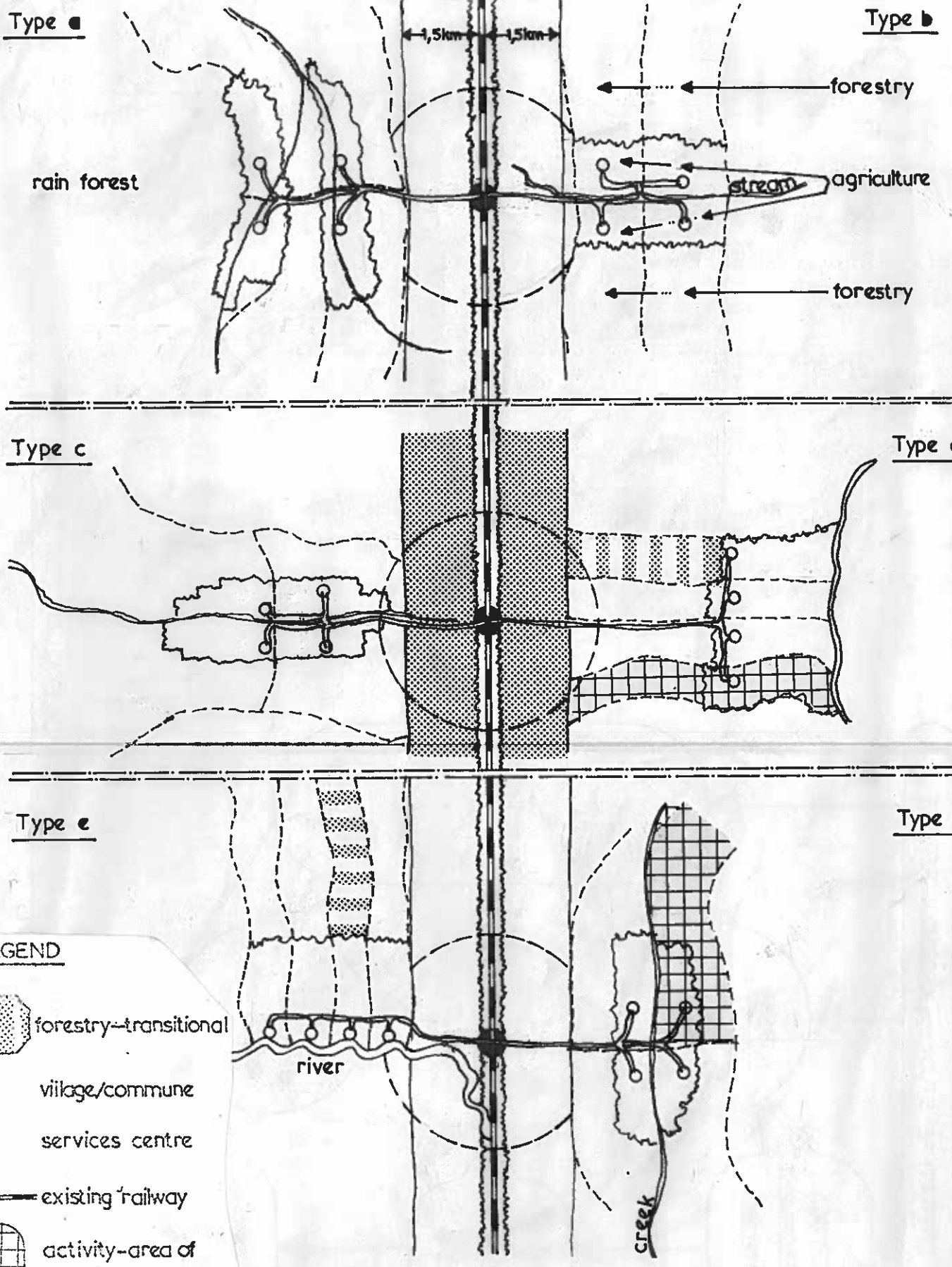
5

4

Paris Jacob stream

Camp 52

Note: Location numbers 1--7 relate to the phasing of implementation.

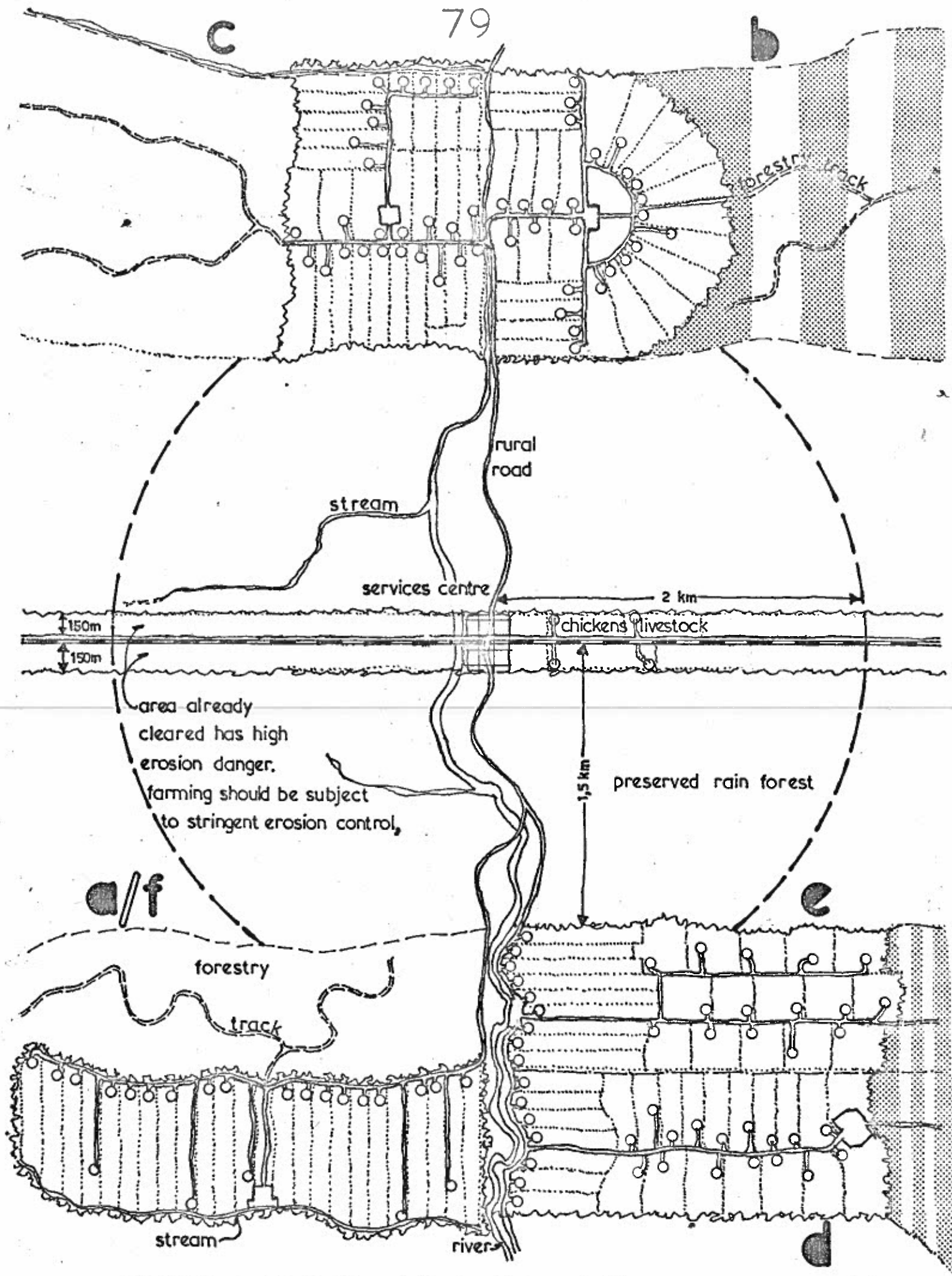


LEGEND

-  forestry—transitional
-  village/commune
-  services centre
-  existing railway
-  activity-area of one village: 3,5 km²
-  preserved rain forest to maintain structure of rain forest, also to prevent soil erosion

Settlement Layout Types Plan Study 3

Scale 1 / 100 000



Plan Study 3 Detailed Layout: Services Centre and Villages

Scale 1/20 000

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