A middle course has been chosen for the degree of detail for each subject; should further detailing appear necessary, this is considered to be within the competence of the discipline concerned.
The required accuracy (e.g. intensity of observation) for the data is deliberately not mentioned, because this depends on two factors: (i) the purpose for which the data are to be used and (ii) the quality of the data with which they are to be amalgamated. The discipline(s) concerned will have to decide the required accuracy, depending on the demands of the planning stage. The man-power needed for a specific activity can also be derived from this requirement.
In the column 'stage' of the checklist the number of the stage in which data are first required is indicated. Important data, however, will obviously be subject to further refinement in subsequent stages.
The last column of the checklist shows which other disciplines might have an interest in certain items of information and whether they can be made responsible for their collection. Consultation with those disciplines is then necessary.
In each specific case of regional planning, the checklist can help to formulate the activities that need to be defined for the network plan.

(6) Numerical review of the activities (Annex III, Section 3)
Because it is not easy for the individual discipline to recognize his complete task from Annexes I and II, a numerical review of his activities has been compiled. Listed in a table for each discipline are all code numbers of the activities in which that discipline is expected to participate. The table groups the activities per stage, and further indicates (in main and sub-columns) whether the discipline is mainly responsible or not, and whether the activities are interdisciplinary or monodisciplinary.

(7) Numerical reviews of the organizational activities (Annex IV)
These (two) special reviews outline the organizational functions of the team leader and the key members. These reviews are considered useful for all team members.

6.4 In conclusion

As stated earlier, we of the Research Group believe that the documents we have developed will prove useful for all those involved in regional planning,

but by no means do we suggest that the documents present a universal cut-and-dried program. The documents should function, in a manner of speaking, as a shopping list: they indicate the type of article or combination of articles that should be 'bought', but when the final choice is being made, the articles must satisfy the demands of quality and price.

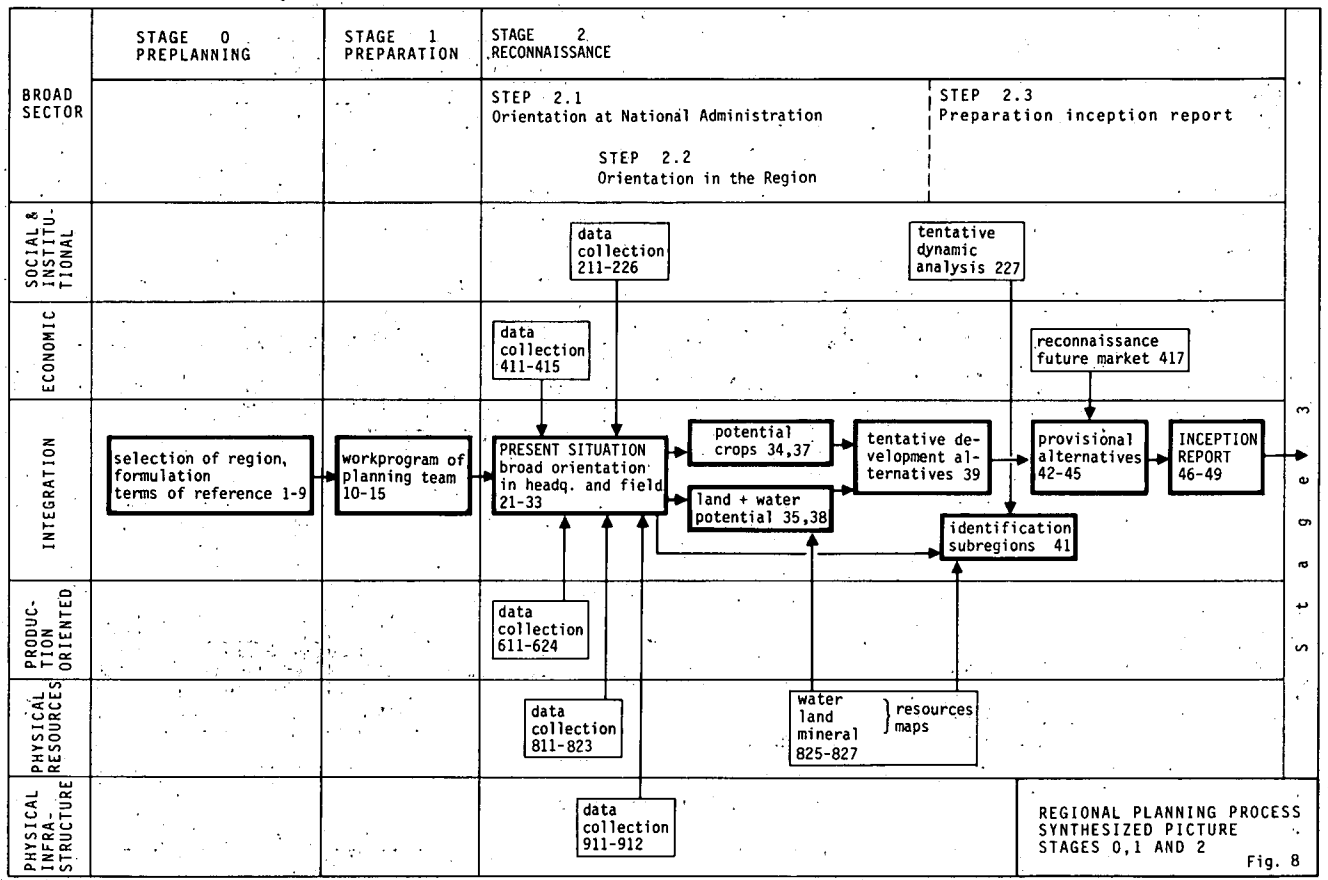

Fig. 8

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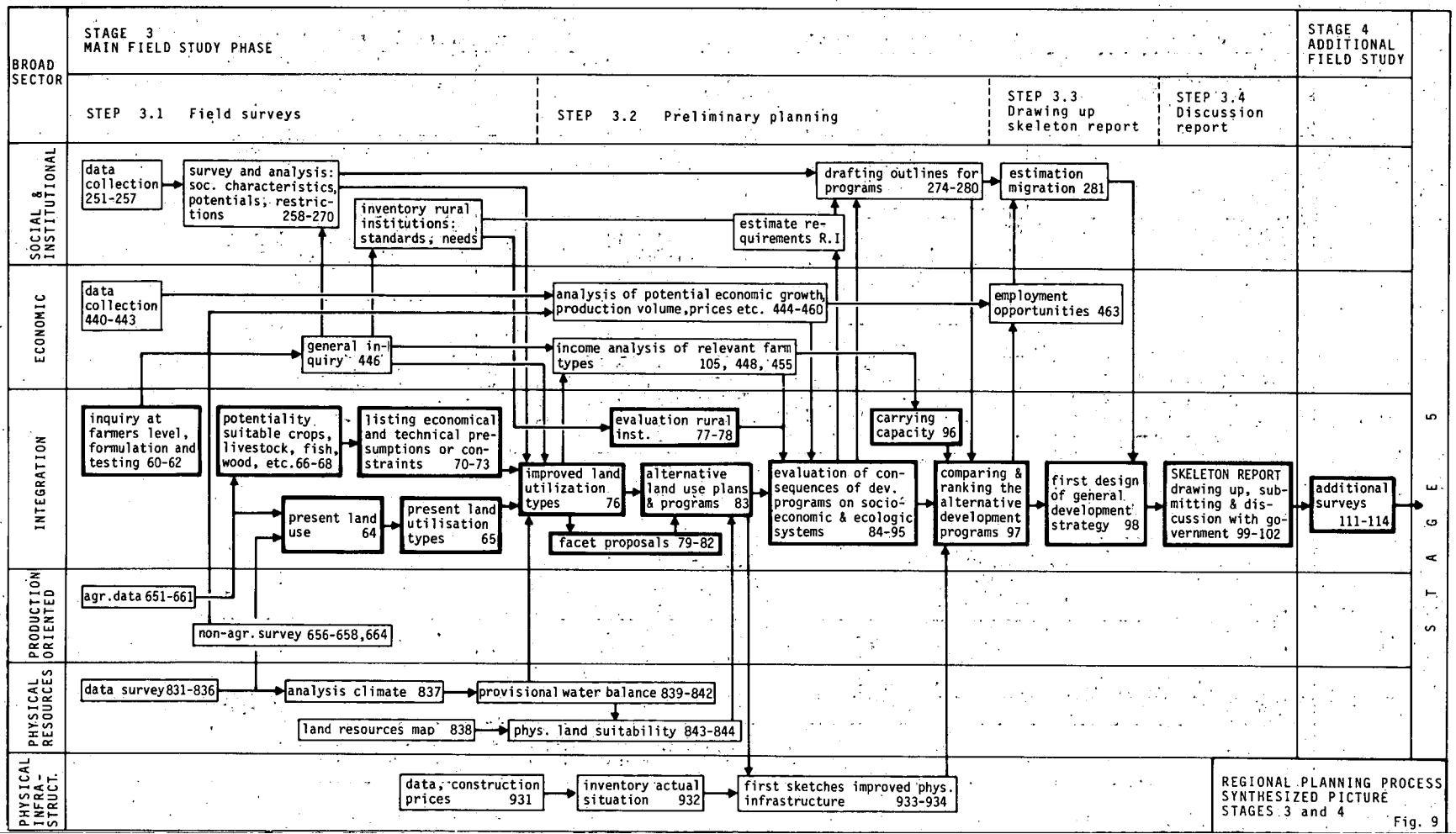
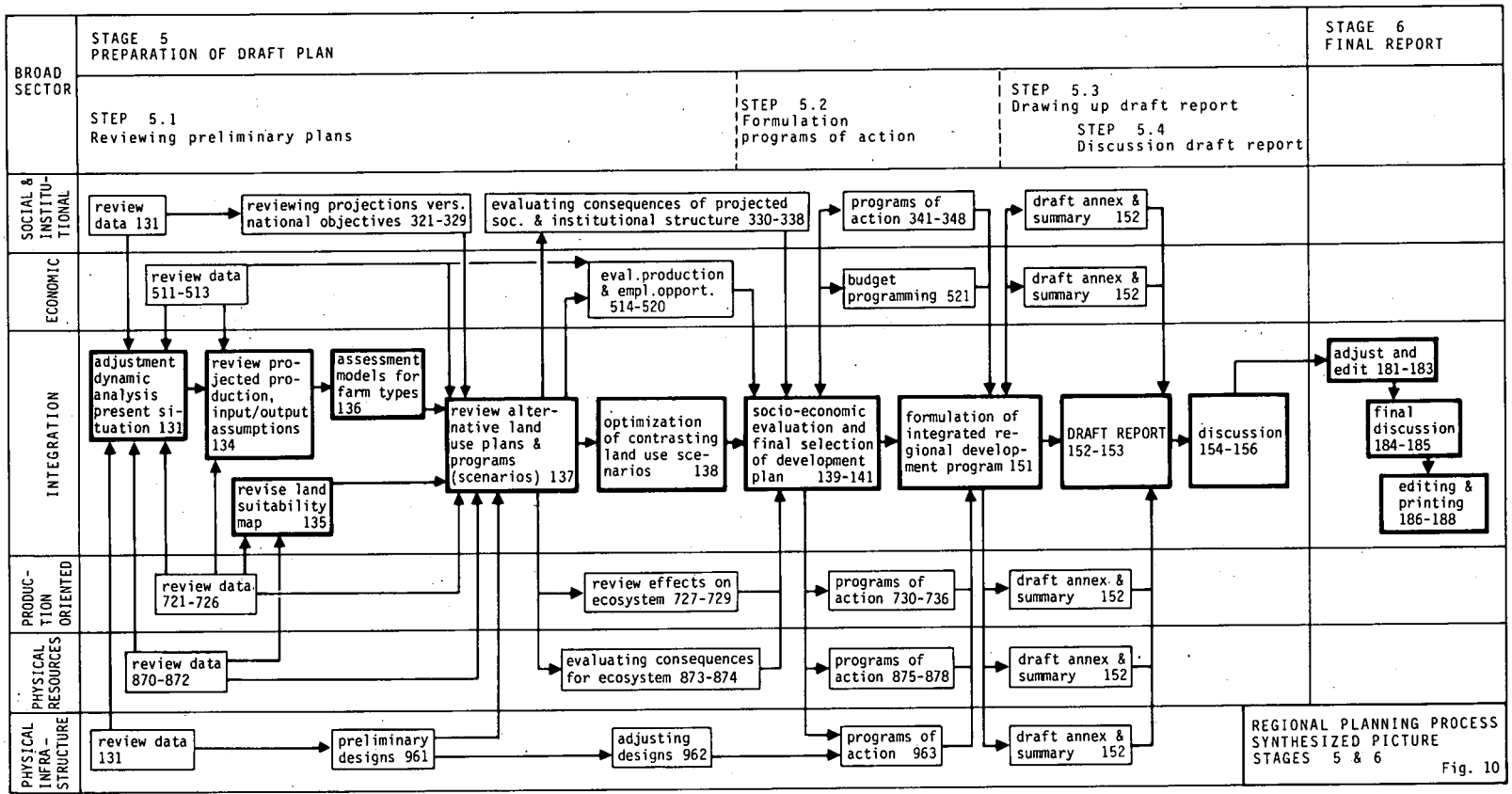


REGIONAL PLANNING PROCESS
SYNTHESIZED PICTURE
STAGES 3 and 4

Fig. 9



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ANNEX I. LIST OF IDENTIFIED ACTIVITIES

ABBREVIATION USED	
Clim	Climate
Geol	Geology
Hydr	Hydrology
Land	Land and Soils
Ecol	Ecology
Crop	Crop Production
AnPr	Animal Production
For	Forestry
Fish	Fisheries and Aquaculture
Min	Mining
Ind	Secondary & Tertiary Production Sectors (industries, etc.)
Dem	Demography
Soc	Sociology
Edu	Education
Ext	Rural Extension
Hea	Health
PubA	Public Administration
Coop	Agricultural Cooperatives
Cred	Agricultural Credit
LT	Land Tenure
MaEc	Macro Economy
AgrEc	Agricultural Economy
IndEc	Economy of non-agricultural production sectors
Infr	Physical Infrastructure
(Civ/Infr)	(incl. civil engineering)

NOTE. Each participant's degree of responsibility is indicated as follows:

(a) mainly responsible
(b) obligatorily assisting
(c) optionally assisting

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		MAIN INTERDISCIPLINARY ACTIVITIES	
		Stage 0: Pre-planning	
	2	1. Government becomes aware of the need for regional planning.	(a) Government
1	3	2. Government decides whether to adopt regional planning as a development policy. If so, assesses the procedure for its introduction.	(a) Government (b) NatPlanAuth
2	4	3. Inter-regional reconnaissance survey. Rate the priority of the regions for which regional planning is practical. Selection of the region(s) for which a regional plan will be prepared. (Possible criteria: high development potential, arrears in development, employment and settlement potential).	(a) NatPlanAuth
3	5	4. The National Planning Authority appoints a Regional Planning Commission responsible for supervising the preparation of the plan, and demarcates its responsibilities and tasks. (Possible members of Commission: representatives of the National Planning Authority, the relevant national and regional government departments, important regional groups, and non-governmental supporting (financing) organizations, if any). The National Planning Authority, the Regional Planning Commission, and the Supporting Organizations (if any) discuss the preliminary terms of reference for the plan, taking into account the general development aims. They will decide what agencies will be assigned the planning studies. (cf. Sect. 4.3, Stage 0).	(a) NatPlanAuth (b) RegPlanComm

4	6	5. Receive representatives of the agencies mentioned (under 4), usually acquisition officers, accompanied by senior planning experts. Brief orientation visits to the relevant government departments, both national and regional, and to the field.	(a) RegPlanComm (b) Responding Agency(s), Gov Depts
5	7	6. Agencies draft and submit proposals for the work plan in accordance with the preliminary terms of reference; in most instances to be accompanied by a budget or by contract proposals. *Note 1*: Suggestion, if any, for adjustment or modification of the preliminary terms of reference may - subject to certain restrictions - be included; they are to be accompanied by an explanatory statement of the consequences for the study program and the corresponding budget. *Note 2*: Certain Supporting Organizations prefer to judge the proposals for the technical program on the merits of the proposal itself, regardless of the financial consequences; the choice of agencies is then based mainly on the quality of their proposals (program and staffing).	(a) Assigned or responding Agencies
6	8	7. Judgement by the Regional Planning Commission (or the National Planning Authority, as the case may be) together with the Supporting Agency(s) if any, of the proposal(s) received from the responding agencies. If there is more than one proposal, a comparative analysis must be made in order to decide which of the proposals is considered best. The one selected is recommended for formal adoption by the appropriate Government Authority. Possible adjustment of details in the proposal and in the financial conditions for the whole of the operation are to be agreed upon by all parties concerned.	(a) RegPlanComm (b) Supporting Agency

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
7	9	8. Assessment of the terms of reference (which can be subject to adjustment only upon review at the occasion of the Inception Report). Draft a plan of operations (cf. Sect. 4.3, Stage 0) which specifies the following: - a rough description of the region and a summation of the problems and constraints for development; - the preliminary objectives of the regional planning studies; - a general work plan; - the responsibility and tasks of each of the participating departments and agencies; composition of the study team with time schedule; - the allocation of personnel and - if appropriate - arrangements for foreign staff; - the requirements for office space, housing, equipment, means of transport, and other materials; - the reports to be delivered and their dates of publication; - the handling of unforeseen circumstances; - the budget and arrangements regarding payments; - etc.	(a) RegPlanComm (b) Supporting Agency
8	10	9. Assess the Plan of operations. Sign the contracts, if any. Divide organizational and professional functions. Designate the team leader, the key-members, the other permanent team members, the other permanent team members, and the (temporary) consultants.	(a) -RegPlanComm -SuppAgency (b) -Assigned exec. agency(ies)

		Stage 1: Preparation	
9	11	10. General team meeting(s): Team members meet one another and are briefed on the terms of reference, the objectives of the studies, etc.; exchange of experiences and ideas among the team members.	(a) Teaml (b) Teammbs
10	12	11. Discipline-wise literature search on the country in general, and on the region in particular. Also literature search on the specific questions to be studied (per discipline).	(a) All disciplines
11	13	12. General team meeting: Exchange of information gathered from the literature with comments thereon. First evaluation of the available data.	(a) Teaml (b) Teammbs
12	14	13. Each discipline drafts a tentative outline for a work program based on the terms of reference and the other information gathered to date, using the relevant sections of Annex III as guideline.	(a) All disciplines
13	15	14. Integration of the tentative outlines for a definite work program (cf. 13); discussion in a team meeting of the work program including the general time schedule. Specification of the logistic needs.	(a) Teamleader (b) Teammbs
14	21	15. Discussion of the definite work program; completing and adjusting, if needed, the plan of operations and other contractual documents. Setting a date for the commencement of the activities of Stage 2 (The Reconnaissance Phase).	(a) RegPlanComm (b) SuppAgency, Teamleader (c) Keymbs

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		Stage 2: Reconnaissance	
15	22	21. Team-leader presents planning team (or at least the key members) to the National Planning Authority and the Regional Planning Commission.	(a) Teaml (b) Teammbs
21	23,25,811 812	22. Acquainting team members with the national government departments with which they will work; introduction of team members to national liaison officers.	(a) Teaml (b) Teammbs
22	24	23. Obtain information on those national and regional policies and targets from which the objectives for the regional plan may be deduced.	(a) Keymbs
23	27	24. Obtain those general data on the prevailing national socio-economic situation and developments occurring at present which may be relevant for the regional plan.	(a) Keymbs
22	26	25. Per disciplinary sector, gather information on policies, targets, and programs regarding development in general; and any special information concerning development of the region under study. Collect these data at the appropriate governmental departments. Comparison of the data pertinent to the position of the region in relation to other regions, and the national economy.	(a) All disciplines

25	27,211-218, 411-413,611-617,813-817, 911	26. Gather information concerning the organizational structure and administrative procedures of national agencies related directly or indirectly to planning in the region(s). Evaluate the effectiveness in functioning of each of the agencies.	(a) PubA (b) All disciplines
24,26,211-218,411-413, 611-617,813-817,911	28	27. Drawing up a summarizing note on the information obtained on the region, with special reference to the agricultural sector, including: climate, land and water use, cropping patterns, crop productions, agricultural techniques and inputs, farm types, population, agricultural institutions, marketing and agricultural exports.	(a) Teaml (b) Keymbs
27	29	28. General team meeting: exchange of information acquired, prior to the orientation in the region.	(a) Teaml (b) Teammbs
28	30	29. Introduction of team members to the authorities at the regional level.	(a) Teaml (b) Teammbs
29	31,32	30. Acquainting team members with regional departments and introduction to Regional Staff. Joint field visit to the region under the guidance of the Regional Staff to acquire an impression of the region and its population; make a reconnaissance of its main characteristics and problems; investigate its accessibility and infrastructure.	(a) Teaml (b) All teammbs
30	33,219-226, 414-415,618-624,819-823, 912	31. Gather information concerning the organizational structure and administrative procedures of regional agencies related directly or indirectly to planning at the regional level. This includes information on their performance in planning and/or implementation in the past, their means of assisting in collecting complementary data for the regional studies, etc.	(a) PubA (b) All disciplines

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
30	33	32. Obtain information concerning the available means (staff, materials etc.) for logistics during field survey periods of Stages 2 to 5. These include transport, housing; interpreters, drivers, and auxiliary personnel.	(a) Teaml
31,,32,219-226,414,415,618-624,819-823,912	41,227-417	33. General team meeting: exchange of information collected during orientation in the region; assessment of procedure to prepare contributions for the Inception Report.	(a) Teaml (b) All teammbs
415,618,619	36	34. Identify approximately existing types of farm systems in the region.	(a) AgrEc (b) Crop,AnPr, Soc
618,619,620, 621,820,821, 823	36,38,41	35. Make a rough inventory of present land use pattern, existing major land improvements (irrigation, drainage, flood control, soil conservation, etc.) and actual or potential threats to the ecological stability.	(a) Land (b) Crop,AnPr, Hydr,For, Fish,LT,Ecol
34,35	39	36. Make a first rough estimate of the present (agricultural) gross production.	(a) AgrEc (b) Crop,AnPr,For, Fish
415,618,620	39	37. List tentatively existing crops (incl. fodder crops), species, and forest types, and of crops and trees which might be cultivated under the prevailing physical conditions; indicate inputs and outputs, probable yields, and other characteristics or restrictions.	(a) Crop,For (b) AgrEc (c) AnPr,Ecol

35,823,825 826	39,43,44	38. Approximate the land and water potential; sketch tentatively alternative proposals to develop this potential; list possible development limitations. Identification of potential ecological problems (degradation of vegetation or soils, pests, etc.)	(a) Hydr (b) Land,Fish,Ecol (c) Soc,LT
36,37,38	41,42,43	39. Indicate potential agricultural uses emanating from alternative proposals in improving land and water conditions (cf. 38). Make a first rough estimate of the potential agricultural gross production.	(a) AgrEc (b) Hydr,Land,Crop, AnPr,For,Fish
414,623,624, 825,827	42,45	40. Evaluate roughly the non-agricultural production sectors in the region; estimate present gross income of these sectors; evaluate development potentials and possible restrictions.	(a) IndEc (b) Ind,Min (c) MaEc,AgrEc
33,35,39,219, 223,226,227, 825,826,912	43	41. Subdivide the region into subregions if needed for planning, considering such factors as homogeneity in agricultural pattern, physiographic or demographic variation, hydrological boundaries, public administrative boundaries, etc.	(a) PubA (b) Teaml,Soc,Hydr, Land, MaEc, AgrEc,LT
39,40,219, 223,226,227, 417	45	42. Assess the socio-economic level and relative position of the region in the national economy; compare the region with other regions, with special emphasis on actual and potential agricultural production, employment opportunities, income acquisition and distribution etc.	(a) MaEc (b) AgrEc,IndEc, Dem,Soc
38,39,41	44	43. Estimate roughly investment costs for each alternative proposal (cf. 38). Estimate the existing implementation capacity, based on previous work in the region.	(a) MaEc (b) Hydr,Civ/Infra, Land,AgrEc, IndEc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
38,43	45	44. Make a selection from the tentative alternative proposals (cf. 38) by eliminating those which are considered hazardous, too extensive or too costly. Then indicate the remaining alternatives for further study.	(a) MaEc (b) AgrEc,IndEc (c) Hydr,Land
40,42,44	46	45. Draw up a first sketch of the potential developments in the region, and compare these developments to the national and regional aims. Formulate the main strategies required to attain the development objectives. Submit drafts to a meeting of the complete team for discussion, comments and amendments.	(a) MaEc (b) Teaml,Keymbs, All disciplines
45	47	46. Draft contributions for the Inception Report (text, maps, etc.); these drafts should contain, per discipline, clear concise statements concerning: - the existing state of affairs in the region; - recent developments, new outlooks, and new policies (if any); - elaboration of the preliminary objectives (cf. 8); - first assessment of potential developments; - the evaluation of the presently available data; - the listing of essential data yet to be collected, including the method to be used (inquiries, surveys, literature research, etc.), and the staff and materials required for collection; - the assessment of the data to be obtained from other disciplines, including the timing of their required availability;	(a) All disciplines

		- the proposals for research methodology and for sample areas; - the proposed work schedule of the discipline concerned for the next stages, in particular Stage 3.	
46	48	47. Drawing up the Inception Report; with recommendations for continuing studies, and the work plan for the next stages (preferably in the form of a network graph). If necessary, suggest adjustment in the terms of reference. Editing the Inception Report.	(a) Teamleader (b) Keymbs
47	49	48. Submittance of the Inception Report to the Regional Planning Commission for study.	(a) Teamleader, RegPlanComm
48	60	49. Discussion of Inception Report in formal meeting of Regional Planning Commission and other parties concerned. Adoption of the report. Adjustment, if necessary, of the preliminary terms of reference (cf. 6) and, accordingly of the budget of studies.	(a) RegionPlanComm (b) SuppAgency, Teaml,Keymbs
		Stage 3: Main field study	
49	61	60. Formulate the Agro-Socio-Economic inquiry among farmers and other rural inhabitants in selected areas. Per discipline the questions refer to the following:	(a) Keymbs
		- Family-size and-structure, pattern of leadership and participation. The farmer's targets; his ideas on the restrictions on development, on what improvements he considers necessary, and outlook for the future.	(a) Soc
		- Utilization of extension services; education of family members	(a) Edu/Ext

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		(60 cont'd.)	
		- Sanitation: source of drinking water, place of defecation; health situation of family members during the last two weeks: use of medical services, occurrence of fever with children; dietry habits during the last month: meat, fish, milk, vegetables.	(a) Hea
		- Use cooperative services versus non-institutional services; experiences and ideas of coop. members.	(a) Coop
		- Credit needs, credit use, viability of farming, credit supply limitations, experience with institutional and traditional credit suppliers.	(a) Cred
		- Land tenure arrangements.	(a) LT
		- Farm type and size; land use pattern; farm operations (management); labor film; mechanization; use of inputs such as fertilizers and pesticides and their availability; degree of commercialization; farm income; family income; marketing of products; off-farm prices; division of labor within the family; crop yields per ha.	(a) AgrEc
		- Crop varieties, farm operations, mechanization, methods of water use and control; input use; yields.	(a) Crop
		- Livestock types, production figures, prices.	(a) AnPr
		- Use of wood for building, fencing and fuel; extent of growth and processing of wood or charcoal by farmer; extent of buying, selling and collecting of minor forest products by the farmer; employment of the farmer (or family members) in forest industry.	(a) For

		- Use of fish in the diet; location of fishing water; preferred species; management of aquacultures (fish ponds) if any.	(a) Fish
		- Extent of hunting and poaching (subsistence of commercial) in combination with farming or pastoralism; processing of products. Grazing and hunting rights. Cattle migration or other seasonal movements.	(a) Ecol
		- Availability of qualified labor in the family; need for additional mechanization; marketing restraints on agricultural products to be processed.	(a) Ind
		- Domestic use of water: household-drinking-water, sanitation. Observations on natural water regime: height and duration of floodings, water levels during extreme droughts.	(a) Hydr,Infr
		- Use of the facilities in service centres; wishes on transport system.	(a) Infr
60	62	61. Assess the general questionnaire, choose sample area(s); select and instruct inquirers, assess their work schedule.	(a) AgrEc,Soc (b) Keymbs
61	446	62. Perform a test inquiry in the sample area(s); process and analyse collected data. Adjust questionnaire on basis of results. Assess representative parts of the region for further inquiries; instruct inquirers.	(a) AgrEc,Soc (b) Keymbs
252,255-257, 442,651-654, 834	447	63. Draw up a preliminary description of the farm types, the socio-economic level of the farm types and their mutual linkages; preliminarily calculate farm incomes. Describe the nature of the present institutional support. Coordinate collection of all other data needed to approximate the total agricultural production of the region (cf. 105).	(a) AgrEc (b) Teaml,Crop, AnPr,For,Fish, Ecol,Ind,Soc, Ext,Coop,Cred, LT

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
651-654,834, 836	65,67,838	64. Prepare land use maps of the present situation in maximum possible detail at a semi-detailed scale, including description and evaluation of development trends.	(a) Land (b) Crop,AnPr,For (c) Fish,Ecol
64,838,852,	447,840	65. Convert land use data of the present situation (cf. 64) into specific types of land utilization and/or farming systems. (Note: sometimes this map can be combined with the map of 64).	(a) Land (b) Crop,AnPr,AgrEc
446,659	68,69,105	66. Draw up a selected list of all crops having an existing or a possible market potential, inclusive of fodder crops and forest produce. Crops with obvious constraints (e.g. because of pests) are eliminated. List systematically per crop: yields, input and output quantities (incl. water, labour etc.), costs and selling prices.	(a) AgrEc (b) Crop,For
64,660	68	67. Inventory of the cattle feed supply situation (natural vegetation, forested areas, farm produce offals, imported materials, etc.). Estimation of the present carrying capacity for cattle, and trends. Evaluation of the potential to increase the feed supply from natural grazing areas (relation to wild animal numbers; trends in animals and vegetation).	(a) AnPr (b) AgrEc,Ecol,For, Crop
66,67	70	68. Explore possibilities for increase of livestock feeds from existing or future arable land. Draw up a selected list of livestock with a market potential. List per livestock type the corresponding inputs and outputs, their costs and selling prices.	(a) AnPr (b) AgrEc,Crop,For, Ecol

66,446,842,	71,844,845	69. Specify minimum and optimum water/soil conditions for each of the present and potential crop types, quantity of irrigation water needed per crop (gross and net) inclusive of seasonal distribution, salinity/alkalinity limitations, conditions for drainage, ecological constraints.	(a) Crop (b) Hydr,Land,Ecol (c) Clim,For
68,657	73	70. List structural restraints which may limit existing and future livestock production: diseases, inadequate veterinary, services feed supply, stable facilities, market facilities, processing, industries, distributions of products, etc.	(a) AnPr (b) Ind,IndEc (c) PubA
69	72	71. First approximation of the cost of irrigation water per cubic meter, calculated as a function of the transport distance (for surface water) or of lifting height (for subsurface water). Economic comparison of present and potential crop yields in relation to irrigation inputs.	(a) Hydr (b) AgrEc
71,446	76,453	72. Revision of selected list of potential crops (cf. 66) in the light of new and improved information on outputs and inputs per crop, until no more sizeable economic improvements are found.	(a) AgrEc (b) Crop
70,446	76,453	73. Revision of the selected list of potential livestock (cf. 68) in the light of new and improved information on outputs and inputs per livestock production type, until no more sizeable economic improvements are found.	(a) AgrEc (b) AnPr
254,445,662, 839,932	83	74. Evaluate risks of water-related hazards for the population, for each production sector and in the infrastructural system. Estimate costs of investment and maintenance of regulations or protective measures to diminish these risks. (e.g. protective forests)	(a) Hydr (b) AgrEc,Hea,Civ/Infr,For,IndEc (c) Clim,MaEc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
254,445,657, 658,663,839, 932	80,82,847	75. Propose an allocation (priority rating) of water for social and non-agricultural production purposes (e.g. drinking water, industries power generation, navigation, fishing, recreation, etc).	(a) Hydr (b) Hea,Infr,Min, Ind,Fish
72,73,266, 448,844	79,80,81, 82,455	76. Draw up qualitative proposals for alternative type(s) of land utilization or farming systems which become possible upon the introduction of major land improvements. Proposals to be discussed and selected in a team meeting.	(a) AgrEc,Teaml (b) Crop,AnPr,For (c) All disciplines
263,266,448	271	77. Analysis of the economic, social, and organizational viability of the regional movement for cooperatives; and of the conditions which determine the success of the trend now and in the future.	(a) Coop (b) AgrEc,Soc
264,266,448	272	78. Evaluate the credit institutions, their procedures and loaning conditions. Appraise the experiences with the credit system by various types of farmers. Compare the relation of credit use to the farm budgets.	(a) Cred (b) AgrEc,IndEc,Soc
76	83	79. Draft proposals for management, consolidation and improvement of natural grazing grounds (incl. forests); e.g. through introduction of special plant types such as leguminosae, fertilizers, other management practices; proposals for management control. Preliminary estimation of cost-and-benefit elements for a number of variant proposals. Formulate possible restrictions in the development of these proposals (of a technical, organizational, social, or economic nature).	(a) Crop,AnPr (b) AgrEc,Land,For, Ecol (c) PubA,Soc

75,76,663	83	80. Draft proposals for consolidation or expansion and improvement of fisheries production in the region, and identify possible aquacultural projects. Preliminary estimation of benefits and costs for a number of variant proposals. Formulate possible restraints: technical, organizational, social, or economic (interalia, market potential).	(a) Fish (b) Hydr,MaEc (c) Ind,PubA
76,662,	83	81. Draw up proposals for management, consolidation and improvement of forested areas; for aforestation of other areas for reasons of wood production and animal, plant or soil conservation, inclusive of administrative organization. Preliminary estimation of cost and benefit elements for a number of alternative proposals. Formulate possible technical, social, or administrative restrictions in the development of the alternative proposals.	(a) For (b) AgrEc,Ecol (c) Ind
75,76,842, 845,931	106	82. Estimate potentially available volume of water for agricultural use specified per suitable land development unit (cf. 844), with rough cost figures. Conversion of these volumes into acreages of irrigable land for alternative land utilization types (cf. 76).	(a) Hydr (b) AgrEc
74,79,80,81, 106,267,285 450,451,452,	84,85,86,87, 88,113,274-278,846,848, 933	83. Broad indication of development program(s), containing alternative agricultural land use plans, and the emanating short, middle or long term projects. For each plan to list (a) specific combination of works, (b) general outputs to be expected, (c) socio-economic impacts and (d) assessment of the required manpower. Tentative choice of the most appropriate plans and projects, apt for further investigation. Proposals are to be discussed in a team meeting.	(a) MaEc,Teaml (b) Keymbs, All disciplines

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
83,271-273	90,91,462	84. Evaluate consequences of the alternative development proposals to the situation of credit supply, cooperation and land tenure. Requirements to be estimated per land utilization type and for the region. Future requirements of qualified personnel.	(a) Cred,Coop,LT (b) AgrEc,Soc
83,105	456	85. Rough estimate of the total production per commodity, in volume, after implementation of the most appropriate development proposals (cf. 83). Estimates, specified per production type, to be made for a series of variants conceivable on technical grounds.	(a) AgrEc (b) Crop,AnPr,For, Fish (c) Land,Hydr
83	89,90,91	86. Evaluate the proposed alternative developments and projects by comparison with previously executed plans. Estimate the factors responsible for success or failure of completed or ongoing projects. Draft recommendations for the proposed alternatives.	(a) Soc (b) Keymbs (c) All disciplines
83	90,91	87. Verify the adequacy of legal provisions: basic laws and regulations regarding land and water management, land reform, rural institutions, etc. If necessary, draft suggestions for additional rules and regulations for submittance to the Regional Planning Commission in view of the identified land and water development programs and projects (cf. 83).	(a) PubA,LT (b) Keymbs
83,276,846	92	88. Evaluate consequences of proposed project(s) for the ecology and human environment in and outside the region.	(a) Ecol, For (b) Hea,Fish,Hydr

86,460	92	89. Estimate expected rate of increase of crop yields and animal products after the introduction of new species and improved methods, taking into account the rate of acceptance by farmers of new production methods; estimate changes in intensities of production; estimate per land use and farm type the time required to reach the production level aimed at.	(a) AgrEc (b) Crop,AnPr,Ecol, Soc,Ext
84,86,87, 274-279,286	92	90. Evaluate the adequacy of the capacities in the public administrative agencies to undertake and execute the proposed projects. Special attention is to be given to organization, size and quality of agencies responsible for: land reform, irrigation, land consolidation or conservation, agricultural research, extension, and education. If needed, consider the possibility of reorganization of agencies by joining interrelated agencies into larger units under the control of a restricted number of ministries. Interpret new requirements, if any, in terms of (a) numbers of qualified personnel, (b) facilities for offices and transportation, and (c) budget(s) for investment, operation and maintenance.	(a) PubA (b) Keymbs (c) All disciplines
84,86,87, 274-279,455	92,113	91. Present a complete dynamic analysis of the socio-economic system in the region. Drafting a balanced statement on factors restricting the proposed development projects.	(a) Soc (b) Keymbs (c) Dem,Edu,Ext, PubA,Cred,Coop, IndEc,MaEc, AgrEc,LT

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
88-91	97,463	92. Examine the combined restraints (of social, juridical, policy, organizational, technical or ecological nature) in each of the alternative plans liable to slow down the progress of development. Close examination of the available instruments of the government to influence this development process (investment policies, subsidizing of institutional organizations, price policies, land reform, etc). As a result of this examination, propose possible variants to the alternatives ad 456.	(a) Soc,AgrEc (b) Keymbs (c) MaEc,Coop,Ext, Crop,AnPr,LT, PubA,Ecol
459	463	93. Examine the restrictions in the secondary and tertiary production sectors which limit the extent of development and/or the development rate. Listing the requirements.	(a) IndEc (b) Ind,MaEc, (c) Infr,Soc,PubA
458,664	463	94. Examine the restrictions in mining industries which limit the extent of development, and the development rate. Listing the requirements.	(a) IndEc (b) Min,Ind,MaEc, Soc (c) Infr
457	463	95. Examine restrictions in agriculture-based or allied industries which limit the extent of development and the develoment rate. Listing the requirements.	(a) IndEc (b) Ind,MaEc,Soc (c) Cred,Coop,Infr, PubA
462	281	96. Estimate the future overall carrying capacity for population in the region. Compare this figure with employment opportunities (cf. 462) and with the minimum acceptable family income.	(a) MaEc,AgrEc (b) Soc (c) Dem

92,284,463 934	98,99,113, 849	97. Compare the sorted project proposals (cf. 460). Ranking these alternatives in a sequence of socio-economic importance. Formulate a tentative proposal for selection criteria of the projects and programs. Team discussion on tentative outcomes of the examination; adjustment of the conclusions if necessary. Preliminary selection of the most promising plan variant(s). Instructing teammembers concerning preparation of text elements for skeleton report.	(a) Teaml,Keymbs (b) All disciplines
97,281,283, 849,935	99	98. Roughly describing the preliminary selected regional development plan variant(s) and of the possible strategy(s) needed to attain its (their) implementation, taking into account the objectives, the means and the stated constraints (cf. 92).	(a) Teaml (b) Keymbs
97,98	100	99. Editing of text elements (i.e. correcting previously written work documents) by each of the disciplines involved, for the skeleton report or its annexes. In these texts the existing situation should be characterized by means of a dynamic analysis and be compared to the potentially attainable situation. Every discipline involved provides information on the tentatively chosen development plan, on its implications, and on the examined alternatives; as well as an evaluation of the realization possibilities and the constraints to be expected. Moreover, each discipline proposes a work program for Stages 4 and 5.	(a) Teaml,Keymbs (b) All disciplines
99	101	100. Draft the Skeleton Report: collecting and reviewing the contributions of the respective disciplines; drafting the section "Summary and Recommendation". Estimate the need for additional field studies in selected areas.	(a) Teaml (b) Keymbs

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
100	102	101. Submit the Skeleton Report to the Regional Planning Commisson for distribution to all agencies involved.	(a) Teaml
101	111,131	102. Discussion of the Skeleton Report by the Regional Planning Commission. Teammembers to be present in a consulting capacity. The Commission has to decide on the conclusions and recommendations of Skeleton Report and make a choice from the alternative plans. Furthermore it must be decided whether or not Stage 4 for additional field studies should be included. Formal approval be given on: - outline of the study program - budget extension, if any.	(a) RegPlanComm (b) SuppAgency, Teaml,Keymbs (c) All disciplines
63,65,66,446	85,448	105. First approximation of the existing agricultural production of the region, and per subregion, specified according to: crop, livestock type, forest produce, fish products, wildlife. Estimates to be based on yields per acre (hectare) and average output (volume) per production type.	(a) AgrEc (b) Crop,AnPr,For, Fish,Ecol,Land
82,844,931, 932	83	106. Preliminary identification of land improvement projects on the basis of the physical land suitability map under improved conditions. Designing water management projects (irrigation, power drainage, etc), including regulation works. The level of design must permit cost estimates commensurate to the estimates for the benefits of the projects.	(a) Hydr (b) Civ/Infr,Land

		Stage 4: Additional field studies	
102	112	111. Evaluate the discussions with the Regional Planning Commission, particularly on the need for additional data and studies (cf. 102). Propose a work schedule, per discipline, for the additional field study period.	(a) Teaml (b) All disciplines
111	113	112. General team meeting. Discuss the discipline-wise proposals for additional studies. Decide on the type and depth of these studies taking into account a consistency in the degree of detail for the various disciplines. Assess the work schedule for Stage 4.	(a) Teaml, Keymbs (b) All disciplines
112 83,91,97,99		113. Collect additional data aiming at: - a refinement of previously analysed data; - the study of alternatives so far thought little promising; - the study of new alternatives which are initiated by the Regional Commission or other officials (Supporting Agencies or Government Departments). *Note:* For various disciplines the additional field studies can already start prior to Stage 4, provided that they do not impede the progress of the draft planning such studies may start for example upon completion of the activities. - 83: Indication and selection of land and water development programs. - 91: Comprehensive analysis of the socio-economic system in the region.	(a) Keymbs, Relevant disciplines

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		(113 cont'd.) - 97: Comparison of the proposed alternative projects. - 99: Drafting contributions to the Skeleton Report (including a proposal for the work schedule for the next Stages). Additional data that are not required in the beginning of Stage 5, can be collected parallel with other activities of Stage 5.	
113	131	114. General team-meeting: discuss and evaluate the results obtained from the additional field study phase.	(a) Teaml,Keymbs (b) All disciplines
		Stage 5: Preparation draft plan *Note:* The activities of Stage 3 are for a great deal repeated in Stage 5, resulting in more detail and a greater accuracy. Obviously the supplementary information collected in Stage 4 plays a role. In the following descriptions, numbers between brackets refer to the comparable approximations in earlier activities.	
114	132,133	131. Integrate and review the data results collected in Stages 3 and 4, taking into account the conclusions and recommendations of the Regional Planning Commission's meeting (cf. 102). Estimate expected production, benefits and costs in the with and in the without case. Arrange the data such that integration with the dynamic analysis of the present situation is possible. Easy access is needed for future use in planning and interpretation.	(a) Keymbs,Teaml

- Review the agronomic description (crop lists) of existing crops, and their corresponding potentials, constraints, inputs and expected outputs (cf 72,76,79)	(b) Crop
- Adjust the inventory of the present and potential livestock production and the necessary inputs (cf. 73,76,79)	(b) AnPr
- Update the inventory of the present and potential wood and other forest production (cf. 662,81,97)	(b) For
- Adjust the inventory of the existing and potential fish production, and the necessary inputs (cf. 661,663,97)	(b) Fish
- Update the data on the ecologic situation in relation to the socio-economic development in the region (cf. 852,846,88)	(b) Ecol
- Submit the more detailed and adjusted demographic data to the relevant disciplines (cf. 259,283)	(b) Dem
- Adjust the dynamic analysis of the social situation, with special emphasis on the present social structure, the motivation, communication, and decision patterns (cf. 268,97)	(b) Soc
- Review the description of the education and extension systems, their present adequacy and requirements (cf. 269,280)	(b) Edu/Ext
- Review the health care system and trends, in terms of: - trained staff, facilities and budget; and phasing of requirements (cf. 270,279) - effects of development plans for the future on current health trends.	(b) Hea
- Review the analysis of the existing public administration, including its efficiency and requirements (cf. 262,286)	(b) PubA

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		(131 cont'd.)	
		- Update the data on agricultural cooperatives, including their present function, and their importance in the rural community (cf. 77,277)	(b) Coop
		- Review the analysis of the existing credit system and its requirements: amount of loans and their sources, etc. (cf. 78,84)	(b) Cred
		- Review the consequences of land tenure on the existing land use patterns, the present agricultural development, the social and political structures in the region, etc. (cf. 273, 278)	(b) LT
		- Review the existing and potential mining situation; including inputs, outputs, employment, etc. (cf. 656,664,458)	(b) Min
		- Review the data on the agro-allied and other industries and services; including their growth investment opportunities, and employment requirements (cf. 457,459,657,658)	(b) Ind,IndEc
		- Interpret climatic data with respect to the risks of water-related hazards, the regional water balance, optimal and minimal water/soil conditions per crop, etc. (cf. 837,69)	(b) Clim
		- Provide additional information on characteristics related to mining potentials, construction sites, materials for construction, etc. (cf. 850,851)	(b) Geol
		- Review the water resource data (quantity and quality), including allocation and present water use, the potentials and	(b) Hydr,Civ/Infr

		constraints of the water use with respect to the recommended sectorial plans. (cf. 71,74,75) Elaborate the preliminary designs (cf. 82,106)	
		- Prepare for presentation all data on land resources, such as thematic and integrated maps, tables, figures, and descriptions, under present and potential conditions. (cf. 64,848, 849)	(b) Land
		- Describe the biological balance in the existing and expected situations. (cf. 88,834)	(b) Ecol
		- Review the economic evaluation of production from existing (agricultural and non-agricultural) industries, per type. Evaluate their gross regional income, and the (regional) employment opportunities (cf. 450-452,457-459,462)	(b) IndEc,MaEc, AgrEc
		- Update information on the present policies and rules regarding prices, price limits subsidies and taxes on (agricultural and other) products, production factors, etc. (cf. 441,444,449)	(b) MaEc
		- Review the data on the present agricultural production, yields per ha and average output per production type; forest products, fish products, etc. (cf. 63,105,448)	(b) AgrEc
		- Improve the infrastructural map (scale 1:100.000 to 1:500.000) featuring road systems, service centers, public utilities, etc. (cf. 932,935)	(b) Civ/Infr
131	134	132. Adjust the integral dynamic analysis of the present situation in the region. Draft the relevant chapter for the final report (cf. 100)	(a) Keymbs (b) All disciplines

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
131	135	133. Adjust the land use map of the present situation in maximum possible detail. (cf. 64)	(a) Land (b) Crop,AnPr,For, Hydr,Fish,Ecol
132,511-513 721-726,870	137	134. Review potential production figures and the corresponding input and output assumptions (cf. 85,457-459)	(a) AgrEc/MaEc, IndEc, (b) Crop,AnPr,Ind, Min,For,Fish, Ecol
133,721,725, 726,871,872	136,137	135. Revise the land suitability classification map (cf. 849)	(a) Land (b) Hydr,AgrEc, Crop,AnPr,For
135,322-324, 513	137	136. Assess and rank the farm types to be recommended for the development plan (cf. 76)	(a) AgrEc (b) Crop,AnPr,Soc, LT,Cred,Coop, MaEc
134,135,136, 322-329,511-513,879,961	138,330-335,338, 514,515, 517,727-729,873, 874,962	137. Review the future land use plan and socio-economic structure; adjust the corresponding alternative projects and programs. Select a number of contrasting scenarios for optimization. For each proposal (scenario), complete data must be available on: - the estimated future production rate - investment, operation and maintenance costs	(a) Teaml,Keymbs (b) AgrEc/MaEc, IndEc,Soc,Infr (c) Other disciplines

		- cost/benefit ratios - the manpower needs The draft proposals are to be discussed in a team meeting, and adjusted if necessary (cf. 83,97)	
137,516,520	139	138. Optimization of the scenarios on improved land use and corresponding production programs (cf. 137) by means of criteria, such as: production, value added, (family) income, income distribution, employment, opportunity, etc.	(a) AgrEc/MaEc, IndEc
138,333-338 518-520,727-729,873,874, 962	140,141	139. Integral evaluation of the social, economic, institutional and ecological consequences of the analysed scenarios (cf. 97). Formulate proposals on the types of organization needed for realization, management, operation and maintenance of projects and programs.	(a) Teaml (b) Keymbs
139,962	141,963	140. Verification by all disciplines of the provisional design for the physical infrastructure. Discuss the essential consequences to be expected from the proposed projects and action programs, with respect to housing quarters, public utilities, service centres, etc.	(a) Civ/Infr,Soc (b) All disciplines
139,140	151,341-348,730-736,875-878,963	141. Discuss the results of the evaluation (ad 139) in a team meeting, and adjust if necessary. Finally, select the combination of plans or a limited number of alternative plans, which correspond best to the formulated objectives.	(a) Teaml (b) Keymbs, All disciplines
141,341-348, 521,730-736, 875-878,963	152	151. Check the mutual consistency of the various (discipline-wise proposed) programs of action; if need be adjust them. Assess preliminarily the plan proposal. Formulate the integrated regional development plan and its main components: identified specific projects and programs.	(a) Teaml (b) Keymbs

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
151	153	152. Draw up the Draft Report and its annexes. Make sure that the Annexes include all data, assumptions, calculation methods etc. so that information on execution, reviewing and adjustment of the plan can be obtained without having to consult the original planners.	(a) Keymbs (b) All disciplines
152	154	153. General Team Meeting. Adjust draft(s) if necessary.	(a) Teaml,Keymbs (b) All disciplines
153	155	154. Submit the Draft Report to the Regional Planning Commission for distribution to the sector agencies involved.	(a) Teaml
154	156	155. Study of the Draft Report by the members of the Commission (or of the National Planning Authority, when relevant).	(a) RegPlanComm
155	181	156. Discuss the Draft Report in meeting of the Commission; team-members assist at this meeting in a consulting capacity. The meeting must accomplish the following: - decide which of the submitted proposals are to be accepted - decide whether or no to adjust the proposals - instruct the team concerning the termination of studies, and on the completion of reporting.	(a) RegPlanComm (b) SuppAgency, Teaml,Keymbs (c) Teammbs
		Stage 6: Final Report	
156	182	181. Assess the consequences from discussions on the Draft Report (cf. 156) with respect to the adjustment to be applied.	(a) Teaml (b) Keymbs

181	183	182. Team-meeting. Instruction to the team-members on the proposed adjustments in the Draft Plan concerning the texts of the Annexes, the Main Report and the Summary Report.	(a) Teaml,Keymbs (b) All disciplines
182	184	183. Draft the adjustments required in the Annexes, the Main Report and the Summary Report.	(a) Keymbs, Relevant disciplines
183	185	184. Submit the adjusted texts to the Regional Planning Authority.	(a) Teaml
184	186	185. Discuss the adjusted Draft Regional Development Plan in a meeting of the Regional Planning Authority. Team-members assist in consulting capacity. Assess the contents and conclusions of the Final Development Plan. Assess the number of copies of the Report to be printed.	(a) RegPlanAuth (b) Keymbs,Teaml, Teammbs
185	187	186. Final adjustments in texts of the report and the annexes, with due reference to the conclusions of the meeting of the Regional Planning Authority (cf. 185).	(a) Teaml,Keymbs (b) Relevant disciplines
186	188	187. Finalize editorial work, and have the documents printed.	(a) Keymbs (b) Editor
187	-	188. Present Final Report of the Regional Development Plan to the relevant Authority.	(a) Chairman RegPlanAuth (b) Teaml

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		DISCIPLINARY ACTIVITIES OF THE SOCIAL/INSTITUTIONAL EXPERTISE	
		Stage 2: Reconnaissance[1]	
25,26,811	27	211. Collect from the National Administration the following data from the most recent population census: population size and -distribution over rural and urban parts of the country: distribution per age and sex (population pyramid); distribution of the active population over the economic sectors; birth and death rates; migration rates; etc.	(a) Dem
25,26,811	27	212. Collect from the National Administration information concerning the macro social structure of the country: objectives of the social policy of the government; religious value system; attitude of the national government towards the region; decision patterns between national and regional levels; social mobility; social projections on the future.	(a) Soc

[1] *Note: Collect readily available data (national and regional). Review the degree of detail and reliability and give a preliminary interpretation. Assess the type and extent of additional information considered indispensable for the studies. If needed complete data through field reconnaissance.*

25,26	27	213. Collect from the National Administration data on existing educational systems: percentage of the population attending schools and the distribution of this percentage among various grade levels and school types; characteristics of schools such as the ratio of pupils per teacher and per grade level; level of analphabetism in the population, etc. Data on agricultural extension systems.	(a) Edu,Ext
25,26,811 812	27	214. Collect from the National Administration data on health situation and services: geographic and cultural determinants of epidemiological situation; feeding habits and food quality; environmental sanitation; water supply situation, etc. Statistics on the above.	(a) Hea
25,26,811	27	215. Collect from the National Administration data on public administrative units (provinces, districts, etc.) and the organizational structure of departments involved in regional development.	(a) PubA (b) Other relevant disciplines
25,26	27	216. Collect from the National Administration data on agricultural cooperatives: degree of governmental involvement, the number and type of coops., their regional distribution, business statistics of coops., their management.	(a) Coop
25,26	27	217. Collect from the National Administration data on agricultural credit. Data on existing credit institutions and their programs of action, number, and volume of loans. Data on non-institutional credit. Data on national legislation concerned with credit.	(a) Cred

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
25,26,811	27	218. Collect from the National Administration data on land tenure situation: objectives land tenure policy of the government; existing developments such as land reform, (re)settlement, consolidation. The situation concerning land ownership and tenure arrangements; building and zoning regulations, etc.	(a) LT
31	33,41	219. Collect from the Regional Administration, data on distribution of population within the region; population growth and migration rates, types of ethnic groups, etc.	(a) Dem
31	33,227	220. Collect from the Regional Administration data on social structure and mobility, existing regional social policies, social projections on the future, the social calender, consumer patterns, motivation patterns, social aspects pertinent to future developments (to be obtained from ongoing or completed projects).	(a) Soc
31	33	221. Collect from the Regional Administration data on the existing education systems: their organization and quality, percentage of pupils which complete each grade level; social demand for education; level of analphabetism. Data on non-institutional education systems. Data on the agricultural extension system: its organization, quality and efficiency.	(a) Edu,Ext
31	33	222. Collect from the Regional Administration data on the health services and information systems: reliability of diagnoses, quality of facilities, type of reference system; degree of integration of non-government and government health services. Evaluating attitudes, practice and policies on family planning.	(a) Hea

31	33,41	223. Collect from the Regional Administration data on public administrative organization in the region; tasks and functioning of the departments, their housing facilities. The structure of departments involved in regional development.	(a) PubA
31	33	224. Collect from the Regional Administration data on agricultural cooperatives; number, distribution, type, and viability; membership; their place in relation to traditional forms and to each other.	(a) Coop
31	33	225. Collect from the Regional Administration data on agricultural credit: institutional policy and procedures; relation(s) between programs of action and the existing credit institutions; viability of the credit institutions. Assessment of the importance of non-institutional credit.	(a) Cred
31	33,41	226. Collect from the Regional Administration data on land tenure situation: distribution of various types of land ownership, existing traditional rights to the land; tenure arrangements; volume of land transfers and their costs; reform programs currently underway; historical perspective of land tenure conditions and its consequences on agricultural development.	(a) LT
33,220	41	227. Collect from the Regional Administration a tentative dynamic analysis of the actual social situation: historic review, present social processes, potentials for and restrictions on future social change.	(a) Soc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		Stage 3: Main field study	
49	258,259,443	251. Collect data on size, structure, and distribution of the population; if possible, inclusive of vocation and income distribution in the region. If no recent data are available, replace out of date census information by data collected from, for example, sample surveys and air photo interpretations.	(a) Dem (b) Soc
49,60	63,266	252. Collect additional data on the social structure, the motivation patterns in the social groups, and the decision-making process of the groups in matters of public interest. Execute evaluation studies on the kind of projects (completed or under construction) which will probably be proposed in the regional plan. These studies consist in interviewing formal and informal leaders at the local and regional level, and observation.	(a) Soc (b) PubA
49,60	260,266	253. Collect additional data on the education and extension systems and pertinent local aspects, through an institutional survey.	(a) Edu,Ext (b) Soc
49,60	74,75,258	254. Collect additional data on health and health care in the region; comparing earlier information to these data; make observation on pertinent local variations. Analysis of regional implications.	(a) Hea
49,60	63,263	255. Make a sample survey of different types of cooperative services; interviewing cooperative managers and committees. Examine the quality of information collected and collect additional data on:	(a) Coop (b) Soc,AgrEc

		quality and competence of management, participation of members in cooperative affairs, attendance at meetings, repayment of debts, degree of factionalism within the cooperatives, relation of cooperatives to regional and local politics, degree of self-sufficiency, the power structure within the cooperative (democracy, equality), degree of intervention and control by outsiders and government.	
49,60	63,264	256. Make a sample survey of the credit institutions: single and multipurpose credit institutions (e.g. credit and marketing), private and government institutions. Examine the quality of information collected and collect additional data on: accessibility of the credit supply, degree of utilization of credit funds, prices of credit for short and long term loans, rate of handling requests for loans, appraisal of the farmers' need for credit, loan repayment procedures, etc.	(a) Cred (b) AgrEc,Soc
49,60	63,265	257. Collect additional data on land tenure; analysis of information received so far. Surveying of regional and local institutional services (land registration offices, notaries public, land reform agencies, etc.) for information on: - relation between land tenure-systems arrangements and agricultural potential, - customary rights to land (adherence to, sanctions), - land transfers, past and present, - land disputes, - government actions (adjudication, registration, land reform, consolidation, etc.) - social consequences of the land tenure pattern	(a) LT (b) PubA

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
251,254, 834,837	259,261	258. Examine the factors controlling the present birth and death rates, and of their trends.	(a) Hea (b) Dem
251,258	266,269, 270,453,932	259. Prepare a dynamic analysis of the present population and an estimate of future population growth and composition (sexes, age group, etc.).	(a) Dem
253	269,932	260. Make an inventory of location and quality of buildings and facilities used for education and extension services.	(a) Edu,Ext (b) Infr
258	270,932	261. Make an inventory of buildings and facilities used for health services; their quality and location.	(a) Hea (b) Infr
49	285,932	262. Collect additional data on structure and functioning of the public administrative system, its geographical distribution in the region. Identify in particular the local institutions that function as representatives for the local people. Make an inventory of the location and quality of buildings and facilities used for public administration: buildings used by regional and local authorities.	(a) PubA (b) Infr
255	77,932	263. Make an inventory of the location and quality of the facilities (office buildings, warehouses, storage facilities) of the cooperatives.	(a) Coop (b) Infr
256	78,932	264. Make an inventory of location and quality of the buildings and facilities of credit institutions.	(a) Cred (b) Infr
257	267,932	265. Make an inventory of location and quality of land tenure registration offices.	(a) LT (b) Infr

252,253, 259,446	76,77,78, 267-270, 285	266. Formulate expected changes in social characteristics as a result of development trends (to be reported to the disciplines concerned); approximated assessment of potentials and restrictions in the realization of future developments.	(a) Soc
265,266, 446,448	83,268,273	267. Prepare a dynamic analysis of the land tenure situation. Comparison of the responses to the inquiry with the results of the institutional survey. Assess the restrictions on agricultural development resulting from the land tenure situation.	(a) LT (b) Soc
77,78,266 267,285	274	268. Prepare and adjusted and extended analysis of present social situation.	(a) Soc (b) PubA,Coop, Cred,LT
260,266,446	275	269. Prepare an outlining of the present education and extension situation in the region.	(a) Edu,Ext
261,446	276	270. Prepare a dynamic analysis of the health situation in the region.	(a) Hea
77	84,277	271. Further investigate special aspects of the cooperative services (specific for the region); in-depth investigation among the farmers.	(a) Coop (b) AgrEc,Soc
78	84	272. Pursue an in-depth investigation of the credit need, inquiry of the farmers by the credit specialist, ascertaining the attitude of the farmers towards institutional credit, and towards non-institutional credit.	(a) Cred (b) Soc,AgrEc
267	84,278	273. Conduct an in-depth survey through interviews with farmers by the land tenure specialist regarding forms of land tenure.	(a) LT (b) Soc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
83,268	90,91,281	274. Assess development projects and programs (cf. 83) which fit into the social structure and the motivation pattern of the farmers; their potentials and restrictions. Drafting an outline of the programs of action to achieve the required social change for realization of these developments.	(a) Soc
83,269	90,91,280, 933	275. Draft an outline of the required school system and extension services for realization of the proposed development alternatives. Specification of requirements in terms of number of qualified personnel and quality and location of buildings. Budget estimates to improve the school and extension systems.	(a) Edu,Ext
83,270	88,279,933	276. Draft (a) general program(s) resulting from the chosen development projects, including the following information: budget estimates for the program(s), requirements for health care facilities, the number and qualifications of personnel needed.	(a) Hea
83,271	90,91,462, 933	277. Evaluate the consequences of the proposed development alternatives and of the regional trend to form and support cooperatives. Indicate new requirements of facilities and numbers of qualified personnel. Estimate the needed financial support for the cooperatives.	(a) Coop
83,273	90,91,462	278. Evaluate the present land tenure situation regarding the proposed development alternatives. Proposing recommendations for required change(s).	(a) LT

276,456	90,91,462	279. Adjust and detail the necessary health programs for the selected development projects (cf. 456).	(a) Hea (b) MaEc
275	284,462	280. Estimate roughly the output of skilled labour (number of people and level of education), for the present situation as well as for the situation with the recommended school and extension systems. (cf. 275).	(a) Edu,Ext
96,274,462	98,283	281. Estimate the expected migration to and from the region, in view of social mobility.	(a) Soc (b) MaEc,Dem
281	98	283. Describe the expected future size, structure and distribution of the population, including the migratory effects.	(a) Dem (b) Soc
280,462	97	284. Reassess the outline on the required school system and extension services (cf. 275,280).	(a) Edu,Ext
262,266,446	83,286	285. First assessment of the potentials and constraints of the public administrative structure and organization; channels for participation by local people.	(a) PubA (b) Soc
83,285	90,91,933	286. Present a dynamic analysis of the public administrative sector. Drafting a program for improvement in view of the regional development proposals: geographical distribution, local participation, manpower requirement, etc.	(a) PubA (b) Soc,Infr
		Stage 5: Preparation Draft Plan	
131,328	326	321. Review the numbers of people requiring various types of education according to adjusted population projections, and the projected classified manpower requirements. (cf. 275,280)	(a) Edu,Ext (b) Soc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
131	136,137,330	322. Formulate recommendations for measures and policies to strengthen those cooperative institutions that will have to keep pace with the increased agricultural production under the proposed regional development plan. (cf. 277)	(a) Coop
131	136,137,331	323. Formulate proposals for institutional credit support, in linkage with proposals of other institutions such as extension, marketing, etc. (cf. 84,272).	(a) Cred (b) LT,Ext,Coop MaEc
131	136,137,338	324. Identify major problem areas with respect to the land tenure situation resulting from the programs of action (cf. 278).	(a) LT
131,328	137,333	325. Project the expected social structure upon completion of the proposed development plan (or alternative plans) including effects of migration, compare this projection with the original goals and objectives. (cf. 91,274,281)	(a) Soc
321	137,334,962	326. Review need, phasing and location of primary and secondary schools: - submit final estimates of numbers of graduates from various school types - compare projection to national objectives	(a) Edu,Ext
131	137	327. Review the program for environmental health measures, including legislative action required, adjusted to the proposals (scenarios) of Stage 3. (cf. 100,279) Determine the location of future health care centers (map).	(a) Hea

131	137,321, 325,332,512	328. Review the desirability of migration in relation to the future carrying capacity of the region and evaluate its effect on the size, structure and distribution of the population (cf. 100,281,283).	(a) Dem (a) MaEc,Soc
131	137,333, 335,962	329. Formulate proposals for adaptation, reorganization, or upgrading of the existing public administrational structure based on demographic projections, and the future land use plan. Estimate required personnel (number and qualifications). Determine the location of administrative centers, their investment and recurrent costs (cf. 90).	(a) PubA (b) Dem,Edu,Ext, Coop,MaEc,Infr, LT,Soc,Hea,Cred
137,322	336,962	330. Plan type and location of future input-output stores on basis of the land use map of the future situation; plan the improvement of existing stores. (cf. 277) - Determine the corresponding initial investment and recurrent costs. - Test the economic, social and organizational viability of these coop. services.	(a) Coop (b) Cred,Soc,MaEc (c) Crop,Infr
137,323	337	331. Draft proposals for the regional coordination of various credit sources; simplify their procedures and repayment policies. (cf. 84)	(a) Cred
328	139,333, 334,962	332. Describe size, structure and distribution of the future population.	(a) Dem
137,325, 329,332	139,140, 341	333. Formulate the potentials and constraints in the present social structure and motivation patterns. Act likewise for the patterns to be expected upon completion of the proposed plan(s).	(a) Soc (b) PubA
137,326 332	139,140, 343	334. Evaluate the social consequences of the projected educational system.	(a) Edu,Ext (b) Soc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
137,329	139,140, 345	335. Evaluate the consequences of changes in the public administration; review in particular whether an adequate communication will be maintained between the inhabitants and the government agencies (cf. 90).	(a) PubA,Soc
330	139,140, 346	336. Verify the advantages and disadvantages of coop. membership in relation to services supplied by traditional sources (cf. 277)	(a) Coop (b) Soc
331	139,140, 347	337. Evaluate the effects of credit support on the social and institutional structure. (cf. 84)	(a) Cred (b) Soc
137,324	139,140, 348	338. List alternative solutions to problems in land tenure, include suggestions for a program of action. (cf. 278)	(a) LT (b) PubA
140,141, 333,520	151,521	341. Prepare social programs of action necessary to arrive at the projected future situation (cf. 274) including: - some alternative migration programs, responding to the latest information on the region's carrying capacity, - the organization of the required participation and decision patterns (in cooperation with the relevant government agencies), - a staffing program (qualitative and quantitative needs) and its budget requirements; comparing employment opportunities to manpower potential, listing what must be done, when, how and by whom.	(a) Soc (b) PubA,Dem,Edu, Ext, Infr

140,141,334	151,521	343. Draw up a program of action for education and training, as well as for the proposed agricultural extension system. Draw up a budget of initial investment and recurrent costs over the period of execution of the plan; classified according the levels of education (cf. 275), specifying the physical facilities and their location.	(a) Edu,Ext (b) AgrEc
140,141	151,521	344. Delineate the necessary health services structure, conformable to the development plan selected, the projected infrastructure, urban extension, settlement, etc. Prepare a program of action (including organization, staffing, budget, and phasing). (cf. 279)	(a) Hea (b) Infr
140,141,335	151,521	345. Prepare a program of action for the needed additional public administrative organization, including an organogram, staffing requirements, phasing of reorganization, etc. (cf. 90), specification of the physical facilities and their location.	(a) PubA (b) Infr,Soc
140,141,336	151,521	346. Formulate a program of action for the cooperative services, including short, medium and long term budget proposals (cf. 277); specifying the physical facilities needed.	(a) Coop (b) Infr
140,141,337	151,521	347. Prepare a program of action for credit services, including loan application credit disbursement policies, and management of the credit service. List the required facilities, estimate the number and type of personnel required for adequate execution of credit services, etc.; draw up investment and exploitation budgets on short, medium and long term bases. (cf. 84)	(a) Cred (b) Coop,Edu,Ext, Infr
140,141,338	151,521	348. Draw up a program of action with respect to land tenure regulations including the legislative measures, their phasing, etc., permitting the realization of the development plan. (cf. 87)	(a) LT (b) PubA

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		DISCIPLINARY ACTIVITIES OF THE ECONOMIC EXPERTISE	
		Stage 2: Reconnaissance[1]	
25,26	27	411. Collect from the National Administration economic data on activities of the non-agricultural sectors (mining, other industries, trade, tourism, etc.), their business statistics. (cf. 616,617)	(a) IndEc
25,26	27,413	412. Collect from the National Administration data on government objectives regarding national and regional economic development; the national income and income distribution targets; available policy instruments; import and export products and policies; import/export statistics; prices and price policies. In particular, data on the role of agriculture in national development plan; actual agricultural output and trends.	(a) MaEc
25,26, 412,811	27	413. Collect from the National Administration information on the position of the agricultural sector within the national economy by means of following characteristics: location of the agricultural zones in the country; share of the agricultural sector in the	(a) AgrEc

[1] *Note: Collect readily available data (national and regional). Review the degree of detail and reliability and give a preliminary interpretation. Assess the type and extent of additional information considered indispensable for the studies. If needed complete data through field reconnaissance.*

		national income and in the regional income; income distribution within the agricultural sector and the non-agricultural sectors, regional specification on these income distributions; employment generated within the agricultural and in other sectors, its regional distribution; food production and rate of self sufficiency; foreign exchange earnings from this sector; linkages to non-agricultural sectors for current inputs and investments. State economic government policies with respect to the agricultural sector: policies on prices, taxes and subsidies, degree of protection of the agro-sector compared to other sectors; investment policy in agriculture; import-export policy; institutional support in agriculture; effectiveness of government policy in agricultural development; possible income targets for rural householdings.	
31	33,40	414. Collect from the Regional Administration economic data on the non-agricultural production sectors in the region; production and business figures, mutual relationships between the sectors. Visits to the more important units. (cf. 623 and 624)	(a) IndEc (b) Min,Ind
31	33,34,37, 417	415. Collect from the Regional Administration data similar as under 413 particular pertinent to the region. Further, collect data on characteristics of the agricultural management pattern: farm types and their regional distribution; their main products and degree of commercialization; labour- and mechanization rate; trends and limitations; incomes generated and employment situation.	(a) AgrEc,MaEc
33,415	41,42	417. Reconnaissance of future development of the market for agricultural commodities; regional, national, and abroad.	(a) MaEc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		Stage 3: Main field study	
49	442,444	440. Analyse the existing price policy for agricultural products and inputs (taxes and subsidies, minimum and maximum prices, delivery costs, etc.). Compare market prices to economic prices of products and inputs, of foreign currency, capital, skilled and unskilled labour.	(a) MaEc
49	442,443	441. Update and, when possible, detail the available information concerning the present marketing pattern of agricultural products, both foreign and domestic.	(a) MaEc.
49,60,440, 441	63,446	442. Update and, when possible, detail the available information concerning the agricultural management pattern, the farm types, products and incomes.	(a) AgrEc (b) Crop,AnPr
251,441	453	443. Estimate the development of the domestic demand for agricultural products.	(a) MaEc
440,441	449	444. Investigate possibilities for improvement of the price policy on agricultural products and inputs (taxes and subsidies, minimum and maximum prices, delivery costs, etc.) in conjunction with the regional development planning.	(a) MaEc
656-658	74,75,450-452,932	445. Prepare a classified overview of the present activities in the non-agricultural production sectors (primary, secondary and tertiary); their relative importance (production volumes), their location in the region, the quality of the existing plants, their	(a) IndEc (b) Infr,Ind,Min

		infrastructural needs (transport grid, energy, water supply, etc.). Availability of ancillary business, (machine dealers, repair shops, etc). Preliminary listing of potentials and constraints for further development. (cf. 656-658)	
62,442	66,69,72,73, 105,266-270, 285,448,450, 452,663	446. Conduct the general inquiry among the farmers and other rural inhabitants in representative parts of potential project areas on the basis of the adjusted questionnaire. Processing of the data collected to conform to the needs of the disciplines involved.	(a) AgrEc (b) Crop,AnPr,Soc, Hea,PubA,Coop, Cred,LT
105,446,449	76,77,78, 267,455	448. Revised calculation of farm incomes under present conditions (cf. 105), on the basis of additional information on production, market prices, inputs, tenure situation, etc. This calculation applies to the major farm types distinguished according to size, land utilization and management situation (owners, tenants, share-croppers, etc.). Rough classification of the total agricultural income of the region, according to the major farm types.	(a) AgrEc (b) Crop,AnPr
444	448,453,454	449. Draft the anticipated future developments of the market prices, economic prices and marketing pattern of agricultural products (either or not processed) and inputs.	(a) MaEc (b) IndEc,AgrEc
445,446,657	83,457,847	450. Economic evaluation of the agro-based or agro-allied industries, forest industries, the wildlife business, and of their contribution to the gross regional income and the opportunities for employment.	(a) IndEc (b) Ind,Ecol,MaEc, AgrEc
445,656	83,458,847	451. Economic evaluation of the mining industries per type, and of their contribution to the gross regional income and the opportunities for employment. Market-analysis with a view to increased sales.	(a) IndEc (b) Ind,Min

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
445,446,658	83,459,847	452. Economic evaluation of the remaining (cf. 450) secondary and tertiary production sectors, and their contribution to the regional and national income, employment opportunities, etc. Market analysis with a view to increased sales.	(a) IndEc (b) Ind
72,73,259, 443,449, 659-662	454	453. Revised estimate (cf. 443) to the development of the domestic demand for agricultural and other products based on the projected population level, income, income distribution, prices and elasticity of demand.	(a) MaEc (b) AgrEc,IndEc
441,449	456	454. Conduct foreign market analysis studies in view of possible export increase for agricultural, agro-based and other products. Estimate the future foreign market pattern for existing and potential new products.	(a) MaEc (b) AgrEc,IndEc
76,448	91,460	455. Approximately calculate incomes of farm types (existing and new ones) under the future conditions. Rough classification of the estimated total agricultural income of the region according to future major farm types.	(a) AgrEc
85,449,453, 454	279,457,460	456. Compare the specified potential agricultural production increase (cf. 85) to the sales potential in the country and abroad (cf. 453 and 454). Eliminate non-relevant proposals. Choose a number of contrasting alternatives for further analysis from the remaining proposals.	(a) MaEc (b) AgrEc
450,456,932	95,459,462	457. Estimate the future growth of outputs and inputs of the agricultural- and forest- allied industries according to the alternative development plans (cf. 456).	(a) IndEc (b) Ind,MaEc

451,456,932	94,459,462	458. Estimate possible increase in production of the mining industries as a direct or indirect result of: (1) improved market possibilities (2) improved infrastructure (3) improved technical outfit (4) increased agricultural production. Estimate the extent and value of an increased production capacity, the investments necessary for this, and the ensuing employment opportunities.	(a) IndEc (b) MaEc,Min,Ind, Infr
452,456,457, 458,932	93,462	459. Estimate the future growth of the secondary and tertiary sectors as a direct or indirect result of the growth of the primary sectors (cf. 85,457,458) or improved market opportunities. Estimate the extent and value of the future production levels and services, of the necessary investments, and the development of employment opportunities.	(a) IndEc (b) Ind,Infr,Soc, MaEc
455,456	89,461	460. Calculate (1) the gross and net values of the yearly agricultural production under present conditions, taking into account intrinsic development ('without plan'), and (2) the figures of gross and net 'values added' for each of the alternative improvement plans chosen (cf. 456). These calculations are made per farm type, per region, and per subregion. Rough optimalization of the alternative plans by cost/benefit analysis.	(a) MaEc (b) AgrEc (c) Crop,For
460	462	461. Analysis of employment opportunities in agriculture, forestry and wildlife, in the present situation and in each alternative improvement plan (cf. 456).	(a) AgrEc (b) For,Ecol

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
84,277-280, 457-459,461	96,281, 284,463	462. Estimate the existing and future employment opportunities in the main sectors (agriculture, forestry, mining, industry, and the tertiary activity sector). Comparison between supply and demand of skilled labour.	(a) MaEc
92-95,462	97	463. Compare the results of the estimates on family income and employment opportunities (cf. 92,460,462) to the national policies and targets. If necessary, adding variant calculations to determine the margins for the government to decide on an optimal development.	(a) MaEc (b) Soc
		Stage 5: Preparation Draft Plan	
131	134,137,514	511. Determine the projected output increase of the non-agricultural primary and secondary production sectors (mining, industries, manufacturing) as a result of the proposed development projects (cf. 457,458) estimate investment costs.	(a) IndEc,MaEc (b) Ind,Min
131,328	134,137, 515,517	512. Review the data on the demand for and supply of products (particularly agricultural products) on domestic and foreign markets, both at present and upon completion of the development plans. Outline the domestic demand growth for commodities (cf. 453,456).	(a) MaEc (b) AgrEc
131	134,136, 137,515	513. Review and classify the total agricultural output and income of the region according to the proposed major farm types (cf. 85, 460).	(a) AgrEc (b) MaEc

137,511	516,517	514. Determine the projected output increase of the tertiary production sectors (trade and other services) resulting from execution of the proposed development projects. Estimate investment costs (cf. 459).	(a) IndEc (b) MaEc
137,512,513	517,519	515. Compare the specified potential agricultural production increase (cf. 137) to the internal and external marketing potential (cf. 512).	(a) AgrEc,MaEc
514	138,520	516. Identify constraints (economic, social, infrastructural) within the various non-agricultural sectors which may influence output growth rates (cf. 93).	(a) IndEc (b) Ind,Min,MaEc, Soc,Edu,Ext, Infr
137,512,514, 515	518	517. Evaluate the adequacy of the present price policies and actions regarding market potentials, with respect to the proposed regional production increase (cf. 444,456).	(a) MaEc
517	138,139, 140,521	518. Review the projected gross and net values of the annual agricultural production, with and without the development plan. Review the gross and net values added for adopted farm type, subregion and region (cf. 460).	(a) MaEc (b) AgrEc
515	138,139,	519. Analyse and evaluate employment opportunities for various farm type models under present and future conditions (cf. 461).	(a) AgrEc
516	138,139	520. Determine future employment opportunities in the sectors mining, industries, and the tertiary sector (cf. 462).	(a) IndEc
341-348, 730-735, 875-878,963	151	521. Prepare the financial overview of the regional development plan by combining the budgets of the sectoral programs.	(a) MaEc (b) AgrEc,IndEc

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		DISCIPLINARY ACTIVITIES OF THE PRODUCTION ORIENTED EXPERTISE	
		Stage 2: Reconnaissance[1]	
25,26,811, 812	27	611. Collect from the National Administration data on agricultural production zones in the country: specification of crops; ideas on possible new developments; existing agricultural research; its organization, program, results and prospects. Specifications of agricultural products, quality needs and control, storage processing, etc.	(a) Crop
25,26,811, 812	27	612. Collect from the National Administration information on the importance of animal husbandry; occurrence and use of livestock; feed used; research and improvement programs; production figures. Veterinary services; feed supply organization.	(a) AnPr
25,26,811, 812	27	613. Collect from the National Administration data on forestry; wood and wood-products, import and export; exploitation and management of forests, utilization of products; research and reforestation programs.	(a) For

[1] *Note: Collect readily available data (national and regional). Review the degree of detail and reliability and give a preliminary interpretation. Assess the type and extent of additional information considered indispensable for the studies. If needed complete data through field reconnaissance.*

25,26,811, 812	27	614. Collect from the National Administration data on fisheries and aquaculture: dietary importance of fish, import- export statistics; existing natural fish habitats, harvesting methods, distribution and types of aquaculture, aquacultural production figures.	(a) Fish
25,26,811	27	616. Collect from the National Administration data on mining industries: location and types, production statistics.	(a) Min
25,26,811	27	617. Collect from the National Administration data on production and processing activities in secondary and tertiary sectors, viz. industries, handicrafts and services. Data to be classified per type of production, location, characteristics, etc: development policies. (cf. 411).	(a) Ind
31	33,34,35,37	618. Collect from the Regional Administration data on crop production: crops present, varieties of crops used, average output level and variations: intensity of land and water use, the crop calender, cropping methods; fertilizers used, machinery used; potentials and restrictions.	(a) Crop
31	33,34,35	619. Collect from the Regional Administration data on animal husbandry situation in the region: type and distribution of livestock; input and output levels; feed situation; veterinary services available. Data on the potentials and restrictions.	(a) AnPr
31	33,35,37	620. Collect from the Regional Administration data on the important forested areas in the region viz. their location and distribution, function, management and exploitation, and the forestry products. Data on the role of forests in erosion and environment control; research programs.	(a) For

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
31	33,35	621. Collect from the Regional Administration information on the type and location of fish habitats in the region; fish species present; management methods and production for fisheries and aquaculture.	(a) Fish
31	33,40	623. Collect from the Regional Administration data on the mining industries in the region: location and type, production statistics. (cf. 414).	(a) Min (b) IndEc
31	33,40	624. Collect from the Regional Administration technical data on secondary and tertiary production sectors in the region. (cf. 414)	(a) Ind (b) IndEc
		Stage 3: Main field study	
49,60	63,64,659	651. Additional field observations on the present farming methods, crop yields, the crop calender, water use, labour, and other inputs.	(a) Crop (b) AgrEc
49,60	63,64,660	652. Additional field observations on animal husbandry, farming methods, type(s) of livestock, feed supply, animal diseases, veterinary service, organization, production, demand and sale of livestock, etc. Economic analysis of a livestock farm, or of the livestock contribution to mixed farms.	(a) AnPr (b) AgrEc
49,60	63,64,662	653. Collect complementary data on the forest inventory, products and functions, forest management systems, inputs and outputs, research and education, etc.	(a) For (b) Ecol

49,60	63,64,661	654. Collect additional data on fish, fisheries, and aquacultures. Inventory of natural habitat; actual fishery activities, methods of harvesting; aquacultural activities, species, type of aquacultures, intensities; carrying capacity; inputs and outputs; methods and capacities of fish processing and marketing facilities. Analyzing the quality of the water. Collecting additional data on regulations regarding fishing equipment, retainable fish size, etc. Collecting data on the potentials for and restraints on improvement.	(a) Fish (b) Ecol
49	445,664,932	656. Make an inventory of the mining industries: collection of technical data and data on production per type of mining activity; location; kind of products, the processing; volume and value of production. Local sale or export, etc.	(a) Min (b) IndEc
49,60	70,75,445 450,932	657. Make an inventory of agro- forest- or fisheries related industries (processing, preserving etc.). Collection of key data concerning present situation per type of industry; their location, outputs and inputs, markets and market organization, labour (number and skills), utilities needed, etc.	(a) Ind (b) IndEc,For,Fish (c) Crop,AnPr
49	75,445, 452,932	658. Make an inventory of other (cf. 657) secondary an tertiary production sectors, such as manufacturing, building and construction, trade, transport, banking, tourism, etc. Collection of key data per sector on the existing situation: their location, outputs (kind and volume of products or services), inputs, labour and capital requirements, markets and market organization, utilities needed, trade distribution network (regional, national, and abroad).	(a) Ind (b) IndEc,Infr

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
651,834,837	66,453	659. Draft a potential crop list based on the ecological and climatological data; for rainfed as well as irrigated crops.	(a) Crop
652,834,837	67,453	660. Draft a preliminary potential livestock list based on the local ecology and climate.	(a) AnPr
654,832, 834,837	453,663	661. Prepare a fish stocklist including present and potential species for fisheries and for aquaculture, based on the prevailing ecology and climate. Estimate the natural productivity of the present fishing waters; inventorize the in- and outputs of existing and potential aquaculture activities.	(a) Fish (b) Hydr,Ecol
653,834,837	74,75,76, 81,453	662. Draft a potential forest management list with main reference to local ecology and climate.	(a) For
446,661,838 839	75,80	663. Prepare a dynamic analysis of the existing fisheries and aquacultures. Draft recommendations for expansion and improvement; for example, enforcing regulatory measures for the maintenance of natural productivity, introduction of new species and minimization of undersized species, construction fish-ponds, controlling water quality, etc.	(a) Fish (b) Hydr
656,850	94,458	664. Approximation of plans for exploitation of the proven mineral reserves (cf. 850); either by existing installations or by new ones. Their location, accessibility and possible capacity.	(a) Min (b) IndEc,Infr

		Stage 5: Preparation Draft Plan	
131	134,135, 727	721. Adjust the forestry draft proposals, including the projected acreage, expected production capital/output ratios, etc. (cf. 81)	(a) For
131	134,728	722. Adjust the draft development proposals for fisheries in accordance with the expected market demands and the potential production capacity (cf. 80,453/54,663).	(a) Fish
131	134,729	723. Review the planning objectives and the development proposals for new ventures or improvements within the secondary and tertiary production sectors (cf. 457,459). Indicate characteristics and needs of local enterprises, enterprisers' skills, etc.	(a) Ind (b) IndEc
131	134,735	724. Review possibilities for mining exploitation. Compare the regional mining potentials to those of the country. Describe a regional development project for mining, if identifiable. (cf. 451, 458,664)	(a) Min,IndEc (b) Geol
131	134,135, 731	725. Adjust the development proposals for livestock production in accordance with the expected market demands and its potential capacity (cf. 73,76,453/54).	(a) AnPr
131	134,135 730	726. Review the potential crop list and the expected yields and inputs with improved methods, adjusted farm types, etc. (cf. 72)	(a) Crop
137,721	139,732	727. Review the effects of the development plan on the ecology; in particular regarding the natural forest reserves, and the corresponding legislative measures (cf. 88).	(a) For (b) Ecol

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
137,722	139,733	728. Review the effects of the development plan on the ecology; in particular with respect to the natural fish resources and the corresponding legislative measures (cf. 88).	(a) Fish (b) Ecol
137,723	139,736	729. Evaluate effects of mining and manufacturing industries on other sectors, particularly agriculture and the environment.	(a) Ind (b) Ecol,Infr,Min
140,141,726	151,521	730. Draw up a program of action for agricultural development (cf. 79), including programs on agricultural extension, development of intermediate technology, fertilizers, crop protection, seed control, research, etc. Indicate for each program: organization, staffing, physical facilities and budget.	(a) Crop (b) Land,Ext,Ind
140,141,725	151,521	731. Draw up a program of action for animal husbandry development, including such subsectorial programs as animal disease control (organization of veterinary services), breeding, research and extension; indicate the staffing, physical facilities, phasing, and budgets for each (cf. 79).	(a) AnPr
140,141,727	151,521	732. Draw up programs of action for forestry development, such as for aforestation, reaforestation, special plantations, erosion control; including the legislation, organization, staffing physical facilities, phasing, and budget for each (cf. 81).	(a) For
140,141,728	151,521	733. Draw up programs of action for fishery development, including the necessary equipment adjustments, management strategies, legislation (i.e. proposals for fishery laws), organization for control and research, staffing, facilities, budget, and phasing for each. (cf. 80).	(a) Fish

140,141,724	151,521	735. Draw up the program of action for mining enterprises; including staff requirements, physical facilities, infrastructural requirements, investment costs, phasing etc.	(a) Min (b) Infr
140,141,729	151,521	736. Draw up the program of action for secondary and tertiary production sectors; including staff requirements, physical facilities, investment and recurrent costs, foreign exchange component, infrastructure, time schedule, etc.	(a) Ind (b) IndEc,Infr

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		DISCIPLINARY ACTIVITIES OF THE PHYSICAL RESOURCES EXPERTISE	
		Stage 2: Reconnaissance[1]	
22	211,212, 214,215, 218,413, 611-617, 812-817,911	811. Collect from the National Administration topographic maps and any other thematic maps including aerial photographs of the region. Reproduction of maps and/or photo series and delivery to various disciplines according to their specific needs.	(a) Land (b) Clim,Hydr,Geol, For,Ecol,Infr, Crop,PubA,Hea
22,811	214,611-614,813-817,911	812. Collect from the National Administration general data on climatic zones in the country, and their seasonal pattern. Collection, reproduction and delivery of other climatic data in accordance with specific needs of various disciplines.	(a) Clim (b) Hydr,Land,Crop, AnPr,Soc,Hea, Ecol
25,26,812	27	813. Collect from the National Administration data on the national observation network: organization of, location of, and methods employed by the meteorological station(s). Detailed meteorological data on the region.	(a) Clim

[1] *Note: Collect readily available data (national and regional). Review the degree of detail and reliability and give a preliminary interpretation. Assess the type and extent of additional information considered indispensable for the studies. If needed complete data through field reconnaissance.*

25,26,811, 812	27	814. Collect from the National Administration data on past and present water management regime, present water use, and water hazards. Delineation of major watersheds. Data on hydrological and geohydrological research; surveys and systematic observation programs both for the country and the region under study. Data on recent projects for improved water management, in the country, and in the region, executed or not, their investment costs.	(a) Hydr (b) Civ/Infr
25,26,811, 812	27	815. Collect from the National Administration general information on soils, soil surveys, soil classification, soil types, and their relation to land use, land suitability, etc. Data on soil research and soil surveying programs.	(a) Land
25,26,811	27	816. Collect from the National Administration general data on the geological situation. Factors which may affect the potential for or the constraints on development of the region, e.g. mineral reserves, volcanic hazards, etc.	(a) Geol
25,26,811, 812	27	817. Collect from the National Administration national and regional data on animal and vegetation patterns, their exploitation and protection; institutional laws governing natural flora and fauna. Data on wildlife: management, utilization and preservation of the natural wildlife; income generated; legislation and development policies if any.	(a) Ecol
31	33	819. Collect from the Regional Administration information on the representativeness of meteorological stations in the region; verify quality of available observations. If needed, make a reconnaissance of possible additional meteo stations for planning studies.	(a) Clim

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
31	33,35,825	820. Collect from the Regional Administration data on hydrological research facilities in the region and their observation network. Data on completed and ongoing irrigation and drainage projects in the region. Figures on the present water usage for agricultural and non-agricultural purposes. Information on cost components of the major land and water improvements.	(a) Hydr (b) Civ/Infr
31	33,35,826	821. Collect from the Regional Administration additional regional data on soils and soil maps. Field visits to verify available information.	(a) Land
31	33,827	822. Collect from the Regional Administration geological data on the region: verification of information from field visits.	(a) Geol
31	33,35,38	823. Collect from the Regional Administration data on vegetation patterns and functions (soil, water and nature conservation). Data on the region's fauna; distribution of species, if any, injurious to human activities or well-being. Occurrence of environment-related pests and diseases. Data on wildlife management (parks, reserves, hunting regulations) and products (meat, skins, trophies, etc.); existing research. Orientating field surveys.	(a) Ecol (b) Hydr,For
820	38,40,41	825. Preparation of a rough water resources map.	(a) Hydr
821	38,41	826. Preparation of a physiographic base map and of a broad land resources map.	(a) Land (b) Geol
822	40	827. Preliminary evaluation of mineral reserves with a possible development potential.	(a) Geol

		Stage 3: Main field study	
49	837	831. Collect additional climatological data from existing observation stations, from literature, and from files. Execute field checks on previously received data. Install, according to needs, additional observation stations, of a permanent or temporary nature; observation program specified in agreement with interested teammembers. Appoint qualified personnel for execution of the observation programs.	(a) Clim
49,60	661,839	832. Collect additional hydrologic data according to the program defined in the Inception Report. These data concern adequate technical and organizational information with regard to water resources (both surface and subsurface), their present and potential utilization, their quantity and suitability for various purposes, the seasonal distribution; further, the essential physical characteristics which influence their regime, exploitation, and development. Estimate the water balance components. First estimation of potentially available volume of water for agricultural development.	(a) Hydr
49	839,841, 850,851	833. Collect additional data on the geological structure of the region. Special attention to be given to data on water bearing layers (aquifers) and the mineral resources.	(a) Geol
49,60	63,64,258, 659-662,852	834. Collect complementary data on condition and trends in natural vegetation and its exploitation (grazing, burning, shifting cultivation, tourism, wildlife, etc.). Ditto on animal species in general, distribution, status, balance between fauna and vegetation, adverse influences (competition with cattle, poaching). Further in particular, data on the wildlife	(a) Ecol (b) For

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		(834 cont'd.) inventory, products and functions, ecology, wildlife management systems, intensity of hunting (methods), inputs and outputs, research, education. Draw up proposals for future conservation or control.	
49,651	64,838	836. Collect additional data on the land resources, and verify those through field checks. Surveys in the field are limited to carefully selected cross sections and pilot or sample areas. Review of conclusions drawn in previous stages. Presentation of resource maps, preferably at semi-detailed scale (1:20.000-1:50.000).	(a) Land
831	258,659-662,839,852	837. Process the climatic data in view of the needs of the projects; presentation to be made in a form directly useful to the other disciplines (agronomy, hydrology, health, and others).	(a) Clim
64,836	65,663,840	838. Prepare land resources map under the present conditions (without plan), together with a description of the major land characteristics and the relevant qualities for agriculture.	(a) Land
832,833,837	74,75;663, 842,845	839. Establish an (average) water balance for the region under the present conditions in order to approximate the volume of water potentially available for development (if relevant, split up over different watersheds or parts thereof). In early stages, reasonable guesses are made for each of the input and output elements, allowing a margin with upper and lower estimates. The procedure should be continually improved upon receipt of adequate physical data becoming available.	(a) Hydr (b) Clim,Geol

65,838	842,843	840. Identify the physical restraints of certain land characteristics with regard to both present and intensified utilization.	(a) Land (b) Hydr
833	842	841. Prepare a suitability classification for dam sites or other heavy constructions; or, at the least outline the areas which are less suitable for dam sites because of seepage, earthquake hazards unstable structure, etc.	(a) Geol (b) Hydr,Civ/Infr
839,840, 841,931	69,82,845	842. List physically possible measures for major improvements in land and water conditions (irrigation, drainage, soil improvements, etc.). Rough estimates of the costs of investment, operation, and maintenance for each of the measures, both separately and in combination. Costs to be estimated (a) on a standard basis for minor projects, or (b) on the basis of preliminary design for larger constructions.	(a) Hydr (b) Land,Civ/Infr
840	844	843. Draft the map of the physical land suitability classification under the present condition (=without major improvements); to be completed with tables.	(a) Land
69,843	76,106,847	844. Draft the map of the physical land suitability classification under conditions of introduced major land improvement(s) and improved land and water management; map to be completed with tables.	(a) Land (b) Hydr
69,842	82	845. Revise approximation of the regional water balance (if applicable, per watershed) on the basis of newly obtained hydrological data.	(a) Hydr (b) Geol
83,834	88	846. Assess the consequences of the proposed development plans (cf. 83) for the ecology of flora and fauna. Propose conservation measures.	(a) Ecol (b) For,PubA

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
75,450-452, 844,932	848	847. Prepare an interpretation of the land resources data for non-agricultural applications (industries, mining, road systems, tourism, public utilities, building grounds, etc.). existing and potential uses.	(a) Land (b) Infr,Hydr
83,847	97	848. Prepare an integrated land and water resources potentiality map, with description.	(a) Land (b) Hydr
97	98	849. Revise the physical land suitability map(s); to be adjusted to the selected types of land utilization and farm systems.	(a) Land
833	664	850. Estimate the reserves in the region of deposits of coal, salt, mineral ores, hydrocarbonates, etc. Identification of the conditions and constraints for mining of these resources.	(a) Geol
833	934	851. Explore the availability of materials for the construction of roads, dams and other civil-engineering works.	(a) Geol (b) Infr
834,837	65,846	852. Delimitate the major areas marked for wildlife management, with main reference to local ecology and climate.	(a) Ecol (b) Land
		Stage 5: Preparation Draft Plan	
131	134,873	870. Adjust the draft proposals for conservation of flora and fauna, and for controlled wildlife utilization (cf. 846).	(a) Ecol
131	135,879	871. Assess the adequacy of the distribution of water supplies with respect to the demands for the various sector plans (cf. 75,82,83).	(a) Hydr

131	135,139, 877,962	872. Review the land suitability maps which are to be adjusted according to the major types of land utilization and/or farm systems (cf. 513,844,848).	(a) Land (b) For,Crop,AnPr
137,870	139,140 878	873. Evaluate the effects of the development program on the ecosystem, the climatic and edaphic situation, resulting from: a) opening up of the area, b) agricultural and pastoral development, c) forestry development, d) creation of national parks, e) river-basin development (cf. 88) Formulate proposals for (complementary) legislation with respect to conservation of land, hunting, etc.	(a) Ecol (b) Land,Hydr,AnPr, For (c) Clim
137,879	139,140, 876	874. Evaluate the consequences of harmful side effects of the development plan, e.g. with respect to sewage water, pollution, salinization effects, etc. (cf. 74,83).	(a) Hydr (b) Infr,Land
131,141	151,521	875. Draw up a program for climatology, which refers to the monitoring, the data collection system and the method of processing on a regional level; indicate budget and phasing (cf. 837).	(a) Clim
140,141,874	151,521	876. Draw up a program of action for water resources development, including: arrangements for longterm data collection (monitoring); list catchment areas and their proposed management-organization; construction program for water management systems; include budgets, staffing, and phasing (cf.83).	(a) Hydr (b) Infr,PubA
140,141,872	151,521	877. Draw up the program of action for land and soil surveys and investigations necessary to prepare the selected regional development project(s), including suggestions on the scale and accuracy of the surveys; staffing, facilities, and budget estimates.	(a) Land

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
140,141,873	151,521	878. Draw up programs of action for ecologic management, such as programs for wildlife protection, recreation parks, land and water conservation, water basin protection; indicate the necessary staffing, budget, and phasing for each (cf. 88).	(a) Ecol (b) For,Hydr,Land
871	137,874	879. Complete the designs for the watermanagement projects (scale at reconnaissance to semi-detailed level). Estimate investment and recurrent costs.	(a) Hydr (b) Civ/Infr

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
		DISCIPLINARY ACTIVITIES OF THE PHYSICAL INFRASTRUCTURE EXPERTISE	
		Stage 2: Reconnaissance[1]	
25,26,811, 812	27,912	911. Collect from the National Administration data on the technical infrastructure and settlement patterns in the country and in the region; policies concerning population settlements, hierarchic arrangement and location of service centers; standards and criteria for establishing service centers.	(a) Infr
31,911	33,41	912. Collect from the Regional Administration inventory of the technical infrastructure in the region; location of living quarters and other facilities, road pattern; threshold values for infrastructural elements; evaluation in relation to standards and local needs.	(a) Civ/Infr
		Stage 3: Main field study	
60	74,82,106, 842,847,932 933	931. Make an analysis of the present local prices of construction materials, machineries, transportation, skilled and unskilled labour for construction, etc.; including the price trends.	(a) Civ/Infr (b) MaEc,Hydr,Soc

[1] *Note: Collect readily available data (national and regional). Review the degree of detail and reliability and give a preliminary interpretation. Assess the type and extent of additional information considered indispensable for the studies. If needed complete data through field reconnaissance.*

Preceding activity	Succeeding activity	Activity number & description	Responsible executor
60,259-265, 445,656-658, 839	74,82,106 457,458,459, 847,933,934	932. Make an inventory of existing buildings (location and quality) in use for public administration and other (semi) government institutions. Collect additional information on the physical infrastructure of the region. Execute field surveys and interview local directors/managers/administrators for verification of existing public works and facilities; their capacity, condition, operation, maintenance, and deficiencies. These data refer in particular to: (a) the public services in towns, villages, and service centers; (b) the transportation network (roads, waterways, air); (c) the public utilities for domestic purposes and for production sectors (electricity, water supply, sewage system, gas, telephone, etc.). Preparation of a statement on the existing situation, preferable with maps.	(a) Civ/Infr (b) Keymbs
83,275-277, 286,931,932	934	933. Present an analysis of the physical infrastructural requirements necessary for the newly proposed developments (cf. 83). Interviewing the Ministry of Interior, regional administrators and local leaders in order to formulate a tentative program concerning the improvement of the physical infrastructure situation and its adjustment to the new projects. Draft proposals for a policy (national or regional) regarding (a) adjustment of standards and thresholds and location criteria for socio-economic services, and (b) types of centers; their criteria and hierarchy.	(a) Infr (b) Keymbs

851,932,933	97,935	934. Present sketches of the required infrastructure corresponding to the major alternative project(s) (cf. 83) with maps.	(a) Civ/Infr
281,934	98	935. Adjust future pattern of housing quarters, service centers and corresponding physical infrastructure, according to the expected size, structure and distribution of the population in the region.	(a) Civ/Infr (b) Soc,PubA, Keymbs
		Stage 5: Preparation Draft Plan	
131	137,962	961. Design preliminary plans for the infrastructural pattern of the various types of service centers, public utilities and road systems, based on the proposed projects and the expected carrying capacity (cf. 102,935).	(a) Infr
137,326,329, 330,332,961	139,140 963	962. Adjust the infrastructural design according to the recommendations resulting from the socio-economic review of the plans (cf. 137).	(a) Infr
140,141,	151,521	963. Review the tentative plans (cf. 139,140) and draw up the program of action for infrastructural development, including the necessary organization, staffing budget, and phasing.	(a) Infr

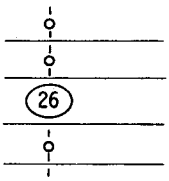
ANNEX II. FUNCTIONALIZED RELATION DIAGRAMS

(separately in the back flap)

LEGEND to the diagram Charts I, II and III

(211) - 'activity' and corresponding number

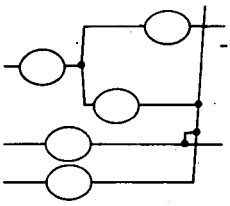
[27] - 'activity' entailing a work document



- multidisciplinary activity to be performed simultaneously (but independently) by the disciplines which are marked with knots on the dash line. One description only (here no. 26) holds for those disciplines together.

(45) or (28) - activity implying a general team meeting

[47] - issue of an interim repport



- lines interconnecting the 'activities' represent their mutual sequence (time axis from left to the right). To avoid an excess of lines these are combined where applicable. The branching or joining of lines is indicated with a dot; this implies that other line crossings have no special meaning.

ANNEX III. DISCIPLINE-WISE CONTRIBUTIONS TO REGIONAL PLANNING

Presented in this Annex and grouped discipline-wise are the following documents:

1. Task and interdisciplinary function.
2. Checklist of the data that each discipline has to collect.
3. Numerical review of identified activities.

NOTES:

ad 1. For further reading on the methods of specific disciplines, see the Selected References.

ad 2. The relevant discipline will bear the main responsibility for collecting the required information, unless otherwise indicated under 'Remarks'. In the column 'Stage' the number indicates the stage in which data are first required. Most of the data will be subject to further refinement in subsequent stages.

A. CLIMATE

H.F. Ledeboer

1. Task and Interdisciplinary function

Main features of the task

The meteorological expert will provide information on the meteorological and climatic conditions of the region. This will cover:

- water balance of the region and/or its component watersheds or land units
- data necessary to delineate possible plant and animal production, and the incidence of rainfall deficiency or excess that may endanger such production
- data for planning hydraulic and civil engineering projects
- data to forecast specific hazards, e.g. night frost, dust storms, typhoons, floods, etc.
- the influence of climatological conditions on health and working conditions.

In the first place, the expert will collect available data from the existing meteorological service and from other sources. He will then check the reliability and accuracy of the data, and guide their processing and presentation in line with the requirements of other disciplines.

Interdisciplinary function

In the Preparation stage, the meteorological expert can give useful indications on the type of climate in the region under study.

In Stage 2 (reconnaissance) the meteorologist starts collecting data on crop growth, on the basis of which other disciplines can estimate crop potentials, irrigation and drainage requirements, etc. Most of his work should be completed at the end of the field work (Step 1) in Stage 3.

Professional expertise required

An expert exclusively trained in meteorology and climatology is seldom

available for a rural regional planning team. Normally, hydrologists, irrigation/drainage experts, or other disciplines of the technical or physical resources blocks will substitute for him. The appointed expert should have had sufficient training and experience in observation methods and statistical interpretation to be able to work out and reliably extrapolate the existing data. The assistance of a specialist in microclimatology may be needed for specific problems in the region.

Usual working methods and sources of information

It is assumed that the country has a meteorological service and that a number of observation stations are located in the region under study, and in neighbouring regions. Records should cover thirty years at least. If these are not available, the installation and operation of an adequate observation network may have to be recommended.
An outline of the work procedure is as follows:

Firstly, an introduction to the management of the meteorological service and any other data sources (airports, water boards, etc.).
Next, the representativity (location and distribution) of stations is checked, followed by a study of the type of data, length of records, presentation, processing capacity, statistical methods and the reliability and accuracy of data. If necessary, a reconnaissance of additional observation stations, such as at missionary posts and agricultural experimental fields, is made.

Specific constraints

The availability of reliable records over a period long enough to calculate risks (frequency distributions) and to set up a water balance is a prerequisite. The use of data from outside the region may form serious constraints to reliability and may therefore lead to errors in estimating potentials of plant growth within the region.

2. Checklist for CLIMATE

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
A1 INSTITUTIONS AND SERVICES	1	
1.1 Observation stations: location, network density	2	
1.2 Instruments, methods, length of records	2	
1.3 Publications, reports, studies, maps	2	
1.4 Other data sources	2	= airports, farm estates
A2 PRECIPITATION*	1	
2.1 Per year, per month	2	
2.2 Per growing season, per decade of days	3	
2.3 Intensities during peak rainfall	3	- with a view to erosion; eng. constr., etc.
2.4 Incidence of hail and snow	2	- as a hazard
2.5 Drought periods	2	
A3 EVAPORATION*	1/2	
3.1 Per year, per month	2	
3.2 Per growing season, per decade of days	3	
3.3 Pan evaporation and lysimeters	3	
3.4 Rainfall excess/deficit	3	- drainage of irrig. requirements
A4 TEMPERATURE*	1	
4.1 Per year, per month	2	
4.2 Per growing season, per decade of days	3	- for calc. of evapotranspiration etc.
4.3 Incidence of night frost	2	

* *Required here are not daily recordings, but statistically elaborated totals (or averages) for the periods: per year, per month, per decade of days.*

Data to be obtained or provided	Stage	Remarks
4.4 Soil temperature	3	
4.5 (Ground)water temperature	3	- various purposes
A5 WIND VELOCITY*	2	
5.1 Per year, per month	2	
5.2 Per decade of days	3	- calc. of evaporation
5.3 Wind direction; rain-bearing, dry wind	2	- growing seasons
5.4 Incidence and type of storms	2	- as a hazard
5.5 Frequence and intensity of storms	3	
A6 AIR HUMIDITY*	2	
6.1 Per year, per month	2	
6.2 Per decade of days	3	
6.3 Dewpoint temperature	3	- calcul. of evapotransp.
A7 DAY LENGTH AND SUNSHINE PERCENTAGE	2	
7.1 Per year, per month	2	
7.2 Per decade of days	3	- calcul. of evapotransp.
A8 NET RADIATION AND CLOUDINESS	3	- calcul. of evapotransp.
A9 CLIMATOLOGICAL CLASSIFICATION	2	

* *see footnote foregoing page*

3. Numerical review of identified activities for CLIMATE (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	812,813	21,22,28	(215),811
2.2	31	819	29,30,33	
2.3	46		45	
2.4				
3.1	60	831,837	(69)(74)(76)	839
3.2			83,(86)(90)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132		131,137,	(873)
5.2		875	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

B. GEOLOGY

J.D. de Jong

1. Task and interdisciplinary function[1]

Main features of the task

The earth's crust within a region is - literally and figuratively - the base of all activities in that region. When long-term development is being planned, a thorough knowledge of the earth's crust in the region and in its immediate surroundings is essential.

The services of a geologist (or other earth scientist) will usually be required to provide this knowledge. He will collect data on the type and structure of the earth's layers, and will interpret and analyse these data to judge (i) whether the area is appropriate for permanent human settlement and (ii) whether exploitation of specific minerals will be feasible.

If this analysis should reveal the probable presence of hitherto unexploited deposits of minerals, ores, oil, gas, etc., this may provide a strong extra stimulus for regional planning.

But even if he makes no new discoveries, the geologist will have an important task to fulfil in deepening the insights into the use of the region's resources. He will draw attention to any circumstances that may limit the intensive use of these resources and will, in particular, be alert to the dangers of en-vironmental degradation that may be brought about by the development activities.

The type of data to be collected by the geologist will depend on the geological structure of the region and the purposes for which the data are to be used.

Roughly, he may have to deal with:

parts of a continental shield consisting of igneous and metamorphic

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[1] *Elaborated by J.M. van Staveren*

rocks, morphologically recognizable as plains and low plateaus;

parts of either fold or fault-block mountains;

sedimentary basins in which the weathering products of a shield or a mountain range have been deposited; these geologically rather young areas are river valleys, coastal plains, and deltas.

Many shields are the bearers of mineral deposits. The foothills of folded mountain ranges and the fringes of sedimentary basins may contain accumulations of oil and natural gas. Sedimentary basins often bear rich supplies of groundwater, sometimes under artesian pressure.

Interdisciplinary function

The geologist may be required to provide expertise to the disciplines concerned with the following:

Mining and quarrying: the search for workable deposits of ore, minerals, salt, solid fuels (coal etc.) oil, natural gas, limestone for cement making, stone for constructions etc.

Land and soils: in explaining the weathering history of the soils of the region.

Hydrology: in tracing water-bearing layers for groundwater development; in selecting suitable sites for dam construction in rivers; in estimating water qualities.

Infrastructure: in finding ways to economize on construction work; for example, in exploring natural foundations for road construction or in tracing out a water supply canal to be excavated in sediments (if sufficiently stable) rather than in rock; further, in locating building materials such as sand, gravel, stone, etc., and finally, in estimating the risks of earthquakes, landslides, dike or dam breaches etc.

Environment/Ecology: in evaluating technical projects that will have a radical effect on the surface water regime; examples are known of erosion that occurs in the lower reaches of a river as a result of reduced sediment transport (as in the Nile Delta after the construction of the Aswan Dam) or of dike breaches that occur as a result of higher river discharges after deforestation. Such situations can, if necessary, be studied with the help of models.

The geological data should be available in Stage 3 at the latest.

Professional expertise required

The geologist's tasks in regional planning may refer to both surface and deep layers of the earth's crust. Since most university-trained geologists specialize in one particular field, a generalist versed in all fields will be difficult to find. The earth scientist (geologist or physical geographer) selected to take part in the reconnaissance stage should therefore be one who has wide experience in the most relevant field. Later, he can be assisted by geologists specialized in mining, hydrogeology, dam construction, oil and gas exploration etc., as they are required.

Usual working methods and sources of information

Through lack of time, the field work of a geologist must be kept to a minimum. He will concentrate mainly on collecting already existing data, which he will find in the literature, in reports of the national geological institute, from the public works department, and from private companies (bore logs).
Aerial photographs, in particular when taken for geologic purposes, are a definite asset, as are satellite observations that may be obtained through the Earth Resource Technology Satellite Program.
If the existing data are inadequate, a survey will have to be undertaken, although it must be realized that this will take at least six months.
For the evaluation of exploitation projects and programs, the geologist will make cost/benefit analyses, if necessary in collaboration with mining experts and others.

Specific constraints

An active geological institute at the national level is a prerequisite for an efficient performance of the geologist's task. The lack of reliable geological maps at the appropriate scales and the explanatory reports with logs of deep borings will form a serious constraint. If geological data are of predominant importance for the regional planning and the available data are inadequate, a geological reconnaissance survey should precede the planning exercise. Alternatively, the exercise could be interrupted after Stage 2 to allow time for the geological survey and resumed when sufficient data are available.

2. Checklist for GEOLOGY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
B1 REVIEW OF LITERATURE ON THE GEOLOGICAL STRUCTURE	1	
1.1 National Geological Survey	1/2	= relevant national agencies (e.g. dept. of geology and mining)
1.2 Geological maps	1/2	= universities, int. geographic agencies, etc.
1.3 Geological aerial survey	2	
1.4 Checking the reliability	2	
1.5 Evaluation	2/3	
B2 GENERAL GEOLOGY	1	
2.1 Stratigraphy	2	
2.2 Main tectonic units	2	
2.3 Tectonic history	2	
B3 ECONOMIC GEOLOGY	1	= dept. of mining; national, regional, or private enterprises
3.1 Ore deposits	2	
3.2 Hydrocarbons	2	
3.3 Coal	2	
3.4 Salt	2	
3.5 Building materials	2/3	
B4 PHYSIOGRAPHY	1	
4.1 Landscapes and land forms	2	
4.2 Geomorphology and Quaternary geology	2	
B5 HYDRO- GEOLOGY	1	
5.1 Drilling reports	2	- cf. C
5.2 Geo-electrical survey reports	2	
5.3 Geologic cross-sections	2/3	

Data to be obtained or provided	Stage	Remarks
B6 GEOLOGIC HAZARDS	1	
6.1 Earthquake hazards	2	
6.2 Volcanic hazards	2	
6.3 Avalanches/landslides	2	
6.4 Erosion	2	

3. Numerical review of identified activities for GEOLOGY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	816	21,22,28	(215),811
2.2	31	822	29,30,33	
2.3	46	827	45	(826)
2.4				
3.1	60	833,841,850, 851	(76)	845
3.2			83,(86)(90)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132		131,137	724
5.2			140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

C. HYDROLOGY

H.F. Ledeboer and K. Roscher

1. Task and Interdisciplinary function

Main features of the task

The hydrologist(s) will provide, in ever increasing detail for the successive planning stages, information on the occurrence and behaviour of the natural water regime and its utilization by man. The availability of water is often characterized by irregularity in time and amount. Both surface and subsurface water systems and their mutual interaction will have to be studied.
In the early stages an overall inventory should be made of:

- the available water resources, the suitability of the water for various purposes, and the present use of the water resources
- the hazards related to the present water regime (floods and droughts) and the hazards related to its present use (erosion, pollution, salinization)
- the present water management practices, and trends.

The studies gradually pass on to the search for and evaluation of:

- potential water resources which can be developed, the suitability of that water, and its potential uses
- improvements in the present water management practices
- protective measures against water-related hazards.

Once the water development strategy is projected, the required technical, administrative, and legal (re)organization has to be evaluated and the required additional survey program defined.

Interdisciplinary function

Given the fact that water is indispensable for all forms of life and for all human settlements, and is of major importance for many economic activities -agriculture in particular - it is obvious that the hydrologist in a

regional planning team has to cooperate with many other team members to meet their manifold requests for information.

His interest should cover:

- the risks of water-related hazards for human settlement and protective measures to diminish them
- the alleviation of constraints or limitations to land use by proper water management practices (irrigation, drainage, desalinization, etc.)
- the allocation of water for domestic water supply, industries, power generation, etc.
- the conditions for navigation, fishing, recreation, etc.

Where the interests of water users are competing or even conflicting, he should look for special solutions to meet a maximum of requirements, for instance:

- through combining uses, simultaneously or successively (e.g. power generation and irrigation) or
- providing storage facilities and/or (re)distribution systems for water to meet specific demands in time and place.

Last but not least, he should take into account the consequences of human interventions on the ecology and the environment in and outside the region.

It will be clear that in all stages of his working program, the hydrologist is a true interdisciplinary team member.

The data this discipline is providing (quantitative and qualitative) will mostly serve as the basis for the work of other disciplines. For this reason the water discipline should complete the bulk of its work not later than in the third stage. This limitation may in certain cases have serious consequences for the programming of the project studies.

Professional expertise required

For the sake of convenience, in the above the water discipline was indicated as the hydrologist. This of course is an oversimplification. The hydrology-science nowadays covers a respectable number of specialized branches: meteo-hydrology, geohydrology, agrohydrology, engineering hydrology, etc. Specialists in these branches stem from various types of universities or professional schools.

The type and number of hydrologists needed for a regional planning team will largely depend on the nature of problems met in the particular region, and

on the quantity (and quality) of the already available data. It may well be that a definite decision on the expertise needed can only be made after a thorough field orientation (Stage 2), despite the draw-back this involves in the programming. In any case one should reckon with a program in which different types of hydrologists will have to be available during the early phases and that certain tasks will be taken over by others in a later stage (3 or 4).

Usual working methods and sources of information

The project recommendations have to be based on the best available hydrological data- records. If these are scarce, approximation techniques will have to be used in the first stages.

While quantitative data will be needed in any case in later stages (the implementation phase), it will almost always be of vital concern to have a hydrologic network installed and a survey program started in the earliest possible stage of planning. Taking into account the instrumentation needed and the minimum observation periods required (at least one hydrologic cycle), these programs tend to be lengthy and costly.

Many of the data to be collected will constitute components (in and outputs) of an overall water balance for the region or parts thereof. To analyze more complex situations, there may be a need for model studies (mathematical, electric, hydraulic), although time and costs may be limiting factors for such.

Specific constraints

Some of the specific problems that the water discipline is likely to be confronted with are:

- the administrative boundaries of the region under study do not coincide with the hydrological units (catchment areas, sub-watersheds); the surveys then have to be extended outside the region
- hydrological data are often scarce and/or poorly distributed and the length of records may be too short to derive reliable frequency distributions
- although technically possible to develop, certain water outputs will be too costly for the proposed purposes; economic boundaries should be projected. In the economic evaluation of water development plans, intangible factors (non-quantifiable) may play an important role (safety, health, nature preservation, etc.)

The major constraint for the water discipline is time. Moreover, if

crucially important hydrological data are lacking at the start, the hydrologist, compared with other team members, will be seriously handicapped.

2. Checklist for HYDROLOGY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
C1 WATER MANAGEMENT ORGANIZATIONS	1	
1.1 National institutions, ministerial departments		- general orient. management data sources
Task and responsibilities	2	
Projects, reports, them.maps	2	
Research facilities, observation network	2	
Instruments, methods, length of records	2	
1.2 Regional and local organizations		
Task and responsibilities	2	
Area under jurisdiction, thematic map	3	
Management, staff, budgets	3	- available and required
C2 LEGISLATION, WATER RIGHTS	1	→ R = also intern. inform., if needed
C3 WATERSHED CHARACTERISTICS	1	
3.1 Subunits: polders, swamps, lakes, etc.	2	
3.2 Area, shape, relief, thalwegs	2	
3.3 Elevation, slope, exposition	2	
3.4 Benchmarks, triangular points	2	
C4 SURFACE WATER RESOURCES	1	
4.1 Occurrence		
Lakes and reservoirs: area, shape, elevation	2	- storage
Rivers and canals: gradient, falls, width, depth	2	- transport medium
Coastal water: depth, tides, currents	2	

Data to be obtained or provided	Stage	Remarks
4.2 Discharge characteristics		
Water level and discharge: average, max, min, per year, per month	2	- constraints, hazards
Flood hazards	2	
Flow velocity: average, max, min	3	
Hydrograph, unit hydrograph	3	
Storage capacity of reservoirs and lakes	3	- actual and potent. use
Sediment load	3	- as a constraint
Controlled guaranteed discharge	3	
4.3 Biological characteristics		→ E, - as a constraint
Aquatic weed growth	3	→ E, - maintenance
C5 GROUNDWATER RESOURCES	1	
5.1 Occurrence		
Natural springs and sources	2	
Wells, artesian wells	2	
Yield - per year, per month	3	
aquifer; tapped, depth of wells	3	
5.2 Aquifer characteristics		
Type: confined, unconfined, leaky	3	
Dimensions: thickness, depth, slope	3	
Isohypses, gradients	3	
Permeability, transmissivity	3	
Storage coefficient	3	
5.3 Aquiclude characteristics		- constraints
Type, dimensions	3	
Hydraulic resistance, infiltration rate	3	
5.4 Ground water level		
Phreatic level; average, max, min	2	
Piezometric level; average, max, min	3	

Data to be obtained or provided	Stage	Remarks
Seepage, deep percolation zones	3	
Drainability by gravity, by pumping	3	
C6 WATER QUALITY		
6.1 Pollution	2	→ L, Y
6.2 Temperature, temperature gradient	3	→ A
6.3 Chemical composition, total salt content	3	
6.4 (Micro) biological constituents	3	
6.5 Sediments	3	
6.6 Suitabilities for various purposes	3	
C7 PLANT-WATER-SOIL RELATIONS		- conc. improvement projects (drainage, irrig, desaliniz. etc.)
7.1 Crop requirements		
Water requirements, comsumptive use	2	
Rootzone requirement: depth	3	→ F
Drainage requirements, criteria	3	
Salt tolerance	3	→ F
7.2 Rootzone characteristics		
Texture structure, soil profile	2	→ D
Chemical characteristics: saline, sodic, acid sulphate	2	→ D
Depth phreatic level and fluctuations, perched watertable	3	
Depth impermeable layers	3	→ D
Ripening: swelling and shrinkage; subsidence	3	
7.3 Soil moisture characteristics		→ D
Infiltration, permeability, percolation, capillary rise	3	
Soil moisture content, pore volume	3	
Retention capacity, field capacity, wilting point	3	
Available moisture, pF curve	3	

Data to be obtained or provided	Stage	Remarks
7.4 Leaching requirements		→ D
Salt concentration and composition; solubility of salt, carbonates	3	
ESP, SAR, CEC electrical conductivity	3	
C8 WATER USE: PRESENT, TRENDS, POTENTIAL		- seasonal distrib. and specific requirements
8.1 Agricultural water use		
Acreages irrigated	2	
Consumptive uses, leaching	2	
Irrigation efficiency	2	
Livestock drinking water	2	
8.2 Domestic use: drinking water, sanitation	2	→ Y
8.3 Industrial use: coolwater, processing water	2	→ L
8.4 Power generation	2	→ Y
8.5 Navigation and transport	2	→ L, Y
8.6 Fisheries and aquaculture	2	→ J
8.7 Recreation and tourism	2	→ Y
8.8 Nature preservation	2	→ E
C9 HAZARDS		- present and potential
9.1 Flooding		
Size and location of data subject to (periodical) flooding	2	
Cause: streams, seawater, groundwater	3	
Frequency, depth, duration	3	
Preventive measures: dikes, dams, reservoirs, drainage Retentive measures: dams, reservoirs	2	
Acreages protected against flooding, discharge improvement	2	

Data to be obtained or provided	Stage	Remarks
9.2 Waterlogging		
Acreages subject to (periodical) high (perched) watertables	2	
Cause sources, rainfall, irrigation, seepage	2	
Frequency, duration	3	
Measures: surface, subsurface	2	
Areas effectively improved	2	
9.3 Drought		see C7 Crop requirements
9.4 Salinization and alkalinization		
Acreages subject to	2	→ D
Sources cause of salt: irrigation water, capillary rise	3	
Measures: leaching, drainage, desalinization	2	
Acreages reclaimed or effectively managed	2	
9.5 Seawater intrusion, tidal influence		
High and low tides, spring tides	2	
Salt tongue intrusion	3	
Minimum river discharge for control, sluices, etc.	3	
9.6 Erosion	2	→ D
9.7 Health	2	→ Q, - cities, sewage
9.8 Pollution hazards	2	→ L
C10 WATERWORKS AND STRUCTURES		- capacity, condtition, maintenance
10.1 Flood control, dikes, river regulation	3	
10.2 Reservoir dams, outlet structures, spillways, hydro-electric plants	3	
10.3 Canals: irrigation, drainage, navigation, structures	3	→ Y
10.4 Road crossings: bridges, ferries	3	
10.5 Drinking water supply system, water towers, industrial water plants	3	→ L

Data to be obtained or provided	Stage	Remarks
10.6 Water treatment, sewage systems	3	
10.7 Harbours, docks, quay walls	3	→ Y
C11 WATER DEVELOPMENT		- as a synthesis, evaluat. and optimalization
11.1 Water balance		
National and regional, excess and shortage	2	
Regional and/or hydrological units	3	
11.2 Water use/utilization, water requirements	2	
Single, multiple, and combined water uses	2	
Unused, directly available water	2	
Hazards, constraints, and limitations of water use		
Unusable water: uncontrolled, contaminated, polluted	2	
Quantitative and qualitative water requirements	3	
Suitability of water for various uses: time, place	3	
11.3 Water management practices	2	
Improvement efficiency actual uses	3	
Storage, retention, and redistribution potential	3	
Protection against flooding, drought, erosion	3	
Reclamation, irrigation, drainage, desalinization	3	
Domestic and industrial water supply, water purification	3	
Pollution control, sewage treatment	3	
11.4 Water resources management	2	
Available water, controlled discharge, safe yield	3	

Data to be obtained or provided	Stage	Remarks
Allocation of water, priorities, trends	3	
Technical aspects, design, capacity, norms	3	
Probability of exceedance, acceptable risks	3	
11.5 Economics of water	2	
Investment costs	3	
Operation and management costs	3	
Cost prices of water for alternative purposes	3	
Benefits; rates of return; priorities	3	
11.6 Organizational and legal requirements	3	→ R
11.7 Social aspects		
Health	3	→ Q
Welfare	3	
Environment	3	→ E

3. Numerical review of identified activities for HYDROLOGY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	814	21,22,28	(215),811,812
2.2	31	820	29,30,33	823
2.3	38,46	825	35,39,41,43,44, 45	
2.4				
3.1	60,71,74,75, 82	832,839,842,845	69,(76),80	61,663,840, 841,844,931
3.2	106		83,(85)(86)(88) (90)	847,848
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	871,874,879	131,133,135,137	873,878
5.2		876	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

D. LAND AND SOILS

K.J. Beek and J. Bennema

1. Task and Interdisciplinary function

Main features of the task

At the commencement of the planning studies, the land and soils discipline should take the lead in preparing a general inventory of the region's land resources. This inventory, to be based on already existing information, should identify land areas that have a development potential, and indicate the prospects of such development.

The inventory will start with the collection of topographical maps and aerial photographs, which are copied per other disciplines according to their specific needs. Next, the present land use map will be drawn up in cooperation with other disciplines of the technical, physical resources, and infrastructural blocks. Normally, the land and soils specialist carries the main responsibility for this activity. In addition, he must make a thorough analysis of the land conditions to determine the specific direction land development will take, indicating any conditions that could hamper this development and the means by which such limitations could be eliminated or reduced.

On the basis of the inventory, the region is subdivided into land areas which, for planning purposes, may be considered homogeneous. The land and soils discipline has be main responsibility in this disaggregation.

The conclusions are then synthesized into land suitability maps for specified types of land utilization. A distinction will have to be made between the suitability classification for present conditions and that for improved conditions.

The results of the land resources evaluation should also be presented in tables and reports, indicating the number of hectares of each land suitability class or subclass. A complementary responsibility of the discipline

involves the evaluation of the impact of the proposed changes in land use on the physical environment.

Interdisciplinary function

Land resources form the basis of development planning, particularly in rural areas. The quality and quantity of land greatly determines the development potentials and constraints. In the early stages of planning, the land and soils discipline should therefore be part of the key group. Active participation of the discipline starts at the beginning of Stage 2 (Reconnaissance). At the end of Stage 3 (Main field Studies), the land suitability classifications and maps, and related land improvement alternatives, should be submitted to the economic and social disciplines for further analysis. The contribution from the land and soils discipline in the identification of land utilization types is essential. During the later stages (4, 5, and 6), participation is restricted to *ad hoc* services to other disciplines and is concerned mainly with a refinement of previously submitted information.

Professional expertise required

The land and soils discipline will be represented by a soil survey expert specialized in reconnaissance surveys and their interpretation. He should also be familiar with modern methods of land evaluation.* He should have the capacity to integrate the data corresponding with the various land attributes, especially soils, water and climate. Depending on the kind of land development problems, one or more other specialists on soil fertility, land drainage, and/or soil conservation may be needed.

Usual working methods, and sources of information

The land resources study is centered on the synthesis of already existing information on the various attributes of the land and their use potential. Usually, soil will be the most variable attribute, but, to determine its variability, the climate, vegetation, topography, and hydrological situation will also have to be considered in their relation to the soil.

The usual method of synthesis is to make overlays of different thematic maps, all on the same scale. The selection of the scale will depend on the available maps, the acreage under consideration, etc. The minimum scale is usually 1:250 000.

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* *Cf. FAO Framework for Land Evaluation, 1976*

For data analysis, the FAO Framework for Land Evaluation (1976) is recommended, but correlation with nationally adopted methods of land resources analysis should not be neglected. Field checking of the data is a must, preferably making use of both aerial photographs and ground control along carefully selected cross-sections. During these field checks, some additional soil sampling and analysis should be undertaken, and representative farmers should be interviewed on their methods of soil management, their problems and their achievements.

Experimental stations or pilot areas need to be visited to obtain more information on the prospects of developing the different types of land. It will be useful to visit the development area(s) during each of the climatically-defined seasons. If the field work can be coordinated with that of the agronomist, it will be most worthwhile to do so.

Specific constraints

The land resources studies will often be subject to limitations due to the scarcity of thematic maps, base maps, and aerial photographs at an appropriate scale and projection. In such cases, obtaining remote sensing imagery from specialized agencies in the early stages of the planning studies could partially solve the problem.

Another serious difficulty may be the unavailability of counterpart staff. The activities require advance planning and authorizations for expenses (rentals, fuel, daily subsistance of local staff, etc.). Since the consulted basic data can vary in accuracy, a statement on the reliability of the conclusions drawn from them will be necessary.

2. Checklist for LAND AND SOILS

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
D1 PRESENT LAND USE	1	
1.1 Natural vegetation	2/3	→ E
1.2 Agricultural land use	2/3	→ F
1.3 Forestry land use	2/3	→ H
1.4 Grassland use	2/3	→ G

Data to be obtained or provided	Stage	Remarks
1.5 Fishery and wildlife land use	2/3	→ E, J
1.6 Other land uses	2/3	→ L, Y
D2 GEOGRAPHY	1	
2.1 Physical subregions	2/3	
2.2 Land types	2/3	
2.3 Land units	2/3	
D3 GENERAL LAND FEATURES	1	
3.1 Position and elevation	2/3	= topograph. maps, etc.
3.2 Relief and slope	2/3	
3.3 Land surface conditions (stoniness, rockiness)	2/3	
3.4 Surface drainage conditions, runoff, infiltration rate	2/3	→ C
D4 SOIL PROFILE DESCRIPTION AND CLASSIFICATION	3	= soil survey manual
D5 SUBSTRATA CONDITIONS		
5.1 Parent material	2	→ B
5.2 Drainage	3	→ C
5.3 Others	3	
D6 LAND QUALITIES (CONSTRAINTS) FOR SPECIFIED USES	2	
6.1 Ecology	3	→ E
6.2 Management	3	
6.3 Conservation	3	
Inundation hazards	3	→ C
Erosion hazards	3	
Salinization (CEC)	3	
Alkalinization (ESP)	3	
Crusting, compactation, others	3	
D7 POSSIBILITIES FOR IMPROVEMENT AND CONTROL OF LAND QUALITIES	2	
7.1 Soil fertilization	3	
7.2 Erosion control	3	

Data to be obtained or provided	Stage	Remarks
7.3 Flood control	3	→ C
7.4 Irrigation	3	→ C
7.5 Artificial drainage	3	→ C
7.6 Tilth improvements	3	→ F
7.7 Other improvements	3	
D8 PHYSICAL LAND SUITABILITY CLASSIFICATION FOR RELEVANT LAND UTILIZATION TYPES	2	
8.1 Present situation	3	
8.2 Improved situation	3	

3. Numerical review of identified activities for LAND AND SOILS (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	811,815	21,22,28	(215),812
2.2	31	821	29,30,33	
2.3	35,46	826	38,39,41,43,44, 45	
2.4				
3.1	60,64,65	836,838,840, 843,844	69,(76),105	842,852
3.2		847,848	79,83,(85)(86) (90),106	
3.3	97,99	849		
3.4			102	
4.	111,113		112,114	
5.1	132,133,135	872	131,137	873,874
5.2		877	140,141	730,878
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

E. ECOLOGY

Chr. Geerling

1. Task and interdisciplinary function

Main features of the task

In recent years people have begun to realize that ecologically sound development and the conservation of renewable natural resources are of more than amateur interest.

The task of the ecology discipline in regional planning is therefore to provide:

- an inventory of the institutional laws governing natural fauna and flora
- an inventory of the renewable natural resources (animal, plant) and an analysis of their exploitation and protection
- an evaluation of the impact of the existing environment on the health of the local population
- an inventory of areas, species, and other components of the ecosystem in need of protection or conservation, either for economic or for scientific reasons
- an assessment of the ecological stability (condition and trends) of the region
- an evaluation of the impact of the future regional development on the existing ecosystem.

Interdisciplinary function

Regional planning has to provide an instrument with which to control the ecological balance and to consolidate the stability of the ecosystem. The impact of human influences and of future development projects will have to be monitored and adjusted. The comprehensive nature of the environmental complex requires the ecology expert to cooperate with most other disciplines in the team, especially those responsible for crop production, animal production, fisheries, forestry, human health, the tourist industry, and recreation.

Wildlife provides proteins for the population with a minimum of investment. Other game products, such as hides and furs, may either be exported or form the basis of local industries. Biggame hunting, if managed carefully, may increase the tourist industry. At other places wildlife is better conserved for its scientific value.

Professional expertise required

For orientation, a generalist in the field of nature conservation and its management is needed. For more detailed studies specialists in botany, hydrobiology, ornithology, zoology, and so on, may be necessary.
In the case of specific environmental problems, such as bilharzia, glossina malaria, or river-blindness (onchocercose), the aid of bacteriologists, virologists, or entomologists might be needed. They should be chosen in consultation with the health expert and other relevant disciplines.

Usual working methods and sources of information

The first step for the ecologist is to become informed on the present situation of the region by collecting data from existing plans and from research institutes, on statistics, studies, literature, maps, and aerial photographs. In the second stage, he should check the information in the field, and conduct any additional surveys as required.

Specific constraints

Irresponsible land use (overgrazing, too short rotations in shifting cultivation, hunting, and so forth), threatens the stability of ecosystems, without providing lasting solutions to problems such as the shortage of food. Another widespread problem is the far from adequate, or even non-existent, enforcement of laws concerning conservation of the environment (hunting, grazing, burning, etc.).
Prerequisites for successfully fulfilling the task are a good working relationship with government agencies at all levels and an awareness on the part of planners from other disciplines of the impact of development projects on the stability of the ecosystem.

2. Checklist for ECOLOGY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
E1 BACKGROUND INFORMATION ON THE REGION	1	
1.1 Formulation objectives and goals	1/2	
1.2 Collecting literature, statistics, etc.	1/2	= from national and intern. literature
1.3 Collecting maps, aerial photographs, etc.	1/2	→ D
E2 INSTITUTIONAL ASPECTS		
2.1 Legislation and rights	2	- cf. U
2.2 Organizational structure and administrative procedures	2	→ R
2.3 Land tenure and ownership	2	→ U
2.4 Financing and taxation	2	→ R - cf. T
2.5 Planning and implementation	2	
2.6 Statistics (tourism, hunting, etc.)	2	
2.7 Research, education, and extension	2	→ O, P
E3 NATURE RESOURCES	2/3	
3.1 Environment	2	- cf. H
Climate	2	→ A
Geology	2	→ B
Soils	2/3	→ D
3.2 Inventory	2/3	
Areas and their legal status	2	→ U
Flora	2	
Herbarium	2/3	
Vegetation maps	2/3	
Condition & trends in vegetation	2/3	
Hydrobiology	2	

Data to be obtained or provided	Stage	Remarks
Aquatic plant growth	2/3	→ J
Fish species	2/3	
Fauna	2	
Animal species	2/3	
Distrib. & status of anim. popul.	2/3	
Migration, mammals and birds	2/3	
Habitat conditions	2/3	
Pests and diseases (local population); their environmental causation	2/3	→ Q - actual and potent.
3.3 Functions	2	
Nature conservation	2/3	
Soil and water conservation	2/3	- cf. C, D, F, G, H, J
Tourism and recreation	2/3	
Food production: meat, fish, vegetable; qualitative and quantitative; actual and potential	2/3	- cf. F, G, H, J
E4 MANAGEMENT		
4.1 Organization	2/3	
Objectives	2/3	
Planning	2/3	
Management system	2/3	
Employment	2/3	
Advertising	2/3	
Accounting and budgets	2/3	
4.2 Technical aspects	2	
Roads, transport, equipment	2/3	- cf. Y
Lodging, communication	2/3	
Interpretation	2/3	
Tourist and hunting facilities	2/3	- lodging, guides, etc.
4.3 Protection	2	
Poaching control	2/3	
Fire control	3	→ H
Grazing control	3	- cf. G
Felling, etc.	3	→ H

Data to be obtained or provided	Stage	Remarks
4.4 Hunting	2/3	
Licences, etc.	2/3	- cf. R
Processing of and trade in meat, trophies, etc.	2/3	- cf. L and X
Animal populations, monitoring and control	2/3	
4.5 Pest control	2	- cf. R
Prevention	2/3	
Scouting	2/3	
Control	2/3	
E5 RESEARCH, EDUCATION AND EXTENSION	3	→ O, P - national, regional and local
5.1 Relationship nature/religion	3/5	
5.2 Relationship nature/medical power	3/5	
5.3 Nature/weather forecasting	3/5	
5.4 Habitat monitoring	3/5	
5.5 Fire	3/5	- cf. H
5.6 Education and extension	3/5	

3. Numerical review of identified activities for ECOLOGY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	817	21,22,28	(215),811,812
2.2	31	823	29,30,33,	
2.3	46		35,(37),38,45	
2.4				
3.1	60	834,852	63,(64),67,68, 69,(76),105	653,654,661
3.2	88	846	79,81,83,(86), 89,(90)(92)	450,461
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	870,873	131,133,134,137	727,728,729
5.2		878	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

F. CROP PRODUCTION

M. Flach

1. Task and interdisciplinary function

For the purpose of these guidelines the tasks of the agronomist(s) have been divided into the following 'disciplines':

crop production
animal production
forestry
fisheries and aquaculture
agricultural economy

The first four disciplines will treat mainly the technical issues of production; they will necessarily have to cooperate (individually, as well as jointly) with the fifth discipline - the economist - for the economic justification of their development proposals.

Within the domains of each discipline, widely diverging exploitation types may be met, ranging from those based on production from the 'natural population' (indigenous crops, natural grassland, wildlife, natural forests, and fish) to those based on 'artificial populations', using newly bred and selected crops and animals.

When selecting agronomists for the team, due attention should be paid to the expected importance of one or more of the above-mentioned disciplines, and to the experience needed to best correspond to the type(s) of exploitation that exist or are to be developed in the region. If it is not possible to make experts available for each major discipline, logical combinations of tasks should be sought, and short-term consultants employed to fill any gaps.

Main features of the task

The task of the crop production expert is:

to prepare a specified evaluation of the technical aspects of the agricultural contribution to the income of the region (dynamic analysis);

to analyse the potentials for crop production both under the present conditions and under an improved use of the available resources;

to select crop combinations to improve the viability of existing farms or for use in farm types to be established on newly developed land.

For the evaluation of the existing situation, as well as for the investigation of the development potentials, it is necessary to have knowledge of the prevailing climate or possible climatic zones within the region; furthermore, the relationship between climate, soil and crop growth (or natural vegetation) should be tested. Evaluation of the existing agricultural situation requires data on the acreage and productivity of the various crops, and on the prevailing farm types and their production, possibly classified per climatic zone and/or soil type. For this evaluation a close collaboration of all land-use disciplines is needed, together with the resources disciplines and the economics discipline. As one of the products of this evaluation, the present land-use map is made.

Making a list of potential crops is an important task of the crop production expert, because this list provides the basic elements in the evaluation of improvement proposals. A provisional list should therefore be drawn up as soon as possible, and be improved and supplemented upon receipt of any new information. It is useful to classify the list according to

crops suitable for world trade;

crops suitable for local marketing;

crops for own consumption.

With the cooperation of the agricultural economist, the agro-technical information is supplemented with the corresponding economic data: labour costs and other relevant input costs, sales prices, etc. Because improvement of agriculture usually means intensification, yields should be estimated (if possible, determined) at a number of different input levels. These levels are determined by the costs required for certain improvements, or a combination thereof: irrigation, drainage, fertilizing, crop protection, mechanization, and so forth.

In close cooperation with the agricultural economist the most promising crops for the region can be selected, resulting in a 'select-crops list'. On the basis thereof, the agronomist is to develop proposals for useful crop combinations which can be fitted into a number of realistic farm types. For that purpose, cooperation with the other land-use disciplines is necessary again, in order to make proposals for (i) selection between competing land use and (ii) combinations of land uses which exceed the scope of the crop production discipline. Here, also, the agricultural economist plays a decisive role, and the help of the resources disciplines is indispensable as well. In these discussions, land utilization types are identified. These serve as the basis for the land suitability map which is usually to be constituted by the land and soils discipline.
Finally, the agronomist must thoroughly investigate the agricultural extension and instruction system (existing and future). This is to be done in cooperation with the sociological and possibly educational disciplines.

Interdisciplinary function

The agronomist/crop production expert has a many-sided, typically interdisciplinary task. Almost all of his activities are executed in collaboration with other disciplines, albeit in alternating positions insofar as responsibility is concerned. As was shown in the preceding Section the cooperation involves working with the resources experts on the one hand and with the economists on the other.
The relationships are tentatively indicated in Annex I and in the 'numerical review' of this Annex. Of course, these relationships must be ascertained for each study program separately, in agreement with the needs of the project and the expertise available from the other members of the planning team.
If crop farming is the dominant land use in the region, the crop production expert must be a full-time member of the team, probably a Key Member. If livestock is predominant, the animal production expert may be the agronomic Key Member.
The activities described in the preceding Section are usually repeated two to three times in the successive stages of the study, the previous information being supplemented and/or adjusted each time. This procedure strengthens the requisite continuous presence of the agronomist/crop production expert

during the planning exercise.

Professional expertise required

The agronomist(s) of the team must have a university education, and be thoroughly knowledgeable and experienced in the type of agriculture occurring in the region in question. In a small study team, the agronomist must be able to handle not only crop production, but also animal production and possibly fishculture as well. In other cases, the combination in one person of agronomist and agricultural economist might be possible. If special problems in agriculture arise in the region, short-term consultants might be added to the team to advise on such problems.

Usual working methods and sources of information

A large portion of the time available is usually needed for the collection of the data on the existing agriculture in the region.

The main sources of such information are the following:

- national and regional agricultural departments and agencies;
- research stations, pilot farms, advanced farmers;
- systematic inquiries among farmers;
- observations made during visits to the field, to markets, and to other places of crop sales.

Visits to the development areas should preferably be repeated during all salient seasons.

The data inventory activities during Stages 2 and 3 usually follow the sequence from F1 to F11 of the annexed Checklist. Those for the planning of the future crop production (mainly in Stages 3 to 5) will be in the following order: F5, F6, F4, F3, F2, giving due attention meanwhile to the items F7 to F11.

The reliability of the data from the various sources has to be thoroughly cross-checked, because they will be further used as the basis for calculations on the future production capacity and the values added (per farm type, and for the region as a whole).

Essential information on each crop should be recorded in a standardized formula (crop sheet) which would contain data on crop varieties, climatic and other environmental constraints, details on cultivation methods, yields (and their variability), pests and diseases, other hazards, etc. In such

crop sheets, the necessary economic data could also be included.

Specific constraints

Prerequisites for the proper planning of agricultural development are reliable figures on the present and potential production. These should be adequately supported by recorded environmental data on climate, the history of the land use, fertility levels, crop rotations, and the hazards of pests. Also, in collaboration with the sociologist, specific attention is to be paid to the farmers' attitude towards new developments.

2. Checklist for CROP PRODUCTION

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
F1 NATURAL ENVIRONMENT	1	
1.1 Climate	2	→ A, - growing cond. & seasons
1.2 Water	2/3	→ C
1.3 Soils	2/3	→ D
1.4 Natural vegetation and fauna	2/3	→ E
F2 LAND UTILIZATION TYPE	1	- in general; preferably with interrelationships
2.1 Collecting, hunting, and fishing	2	→ E, J
2.2 Cultivation of perennial crops	2	
2.3 Cultivation of annual crops	2	
2.4 Grassland utilization and cultivation	2	- cf. E and G
2.5 Animal husbandry	2	→ G
2.6 Aquaculture	2	→ J
2.7 Forestry activities	2	→ H
F3 FARM TYPE	1	- from a techn. viewpoint
3.1 Managerial unit	2	- cf. W
3.2 Labour: availability and skill	2	
3.3 Combination and interrelation of land utilization types	2	→ W
3.4 Orientation of production; market subsistence	2	→ W

Data to be obtained or provided	Stage	Remarks
3.5 Housing and farm buildings	2/3	→ N.
3.6 Degree of mechanization	2	
3.7 Fuel	2/3	- cf. H and L
3.8 Non-farm activities (home industry, transport, etc.)	2/3	→ W, X
F4 CROPPING PATTERN		- past, present, and potent. incl. rough survey of the surrounding regions
4.1 Crops grown: area and yield	2/3	
4.2 Crop rotation: succession & fallow	2/3	
4.3 Cropping calender: soil preparation, planting, flowering, and harvest	2/3	
4.4 Use of mechanization	2/3	
4.5 Labour calendar	2/3	→ W
F5 CROPS	1	- past, present, potential
5.1 Cultivars (origin, duration of growth, quality)	2/3	
5.2 Products and their uses (main and by products and residues)	2/3	- cf. G, L, W and X
5.3 Interrelations between crops	2/3	
F6 CROPPING TECHNIQUES	2	- procedures, time, labour inputs, costs.
6.1 Land clearing	3	
6.2 Soil preparation	3	- cf. D
6.3 Water control	3	- cf. C
6.4 Erosion control	3	- cf. C and D
6.5 Planting	3	
6.6 Promotion of growth and/or production	3	
Control of soil fertility	3	→ D
Crop protection	3	
Special measures	3	
6.7 Harvesting, transport, and storage	3	- cf. W and X

Data to be obtained or provided	Stage	Remarks
6.8 Conservation, processing, and transport to market	3	- cf. X
6.9 Production and storage of planting material	3	
F7 CROP PROTECTION (pest, diseases, weeds)	2	- actual and req.'d methods, organization
7.1 Occurrence and losses during growth	3	
7.2 Post-harvest losses	3	
7.3 Control measures	3	
7.4 Crop protection service	3	
F8 PLANT-SOIL NUTRIENT BALANCE	2	- present and future
8.1 Nutrients used by crop	3/5	→ D
Recycled	3/5	
Removed by product	3/5	
8.2 Nutrient availability	3/5	→ D
In soil	3/5	
From other sources	3/5	
8.3 Nutrient to be added	3/5	→ D
Fertilizer	3/5	
Organic manure	3/5	
Other sources	3/5	
8.4 Organic matter in the soil	2/3	→ D
F9 USE OF INPUTS FROM OUTSIDE	2	- present & future; locally or from elsewhere; their costs (foreign exchange, if any) - cf. W
9.1 Planting materials	3/5	
9.2 Implements	3/5	
9.3 Materials	3/5	
9.4 Materials for soil fertility control	3/5	
9.5 Traction and power; animal, mechanical	3/5	

Data to be obtained or provided	Stage	Remarks
9.6 Hired labour	3/5	
9.7 Contractors	3/5	
F10 FOOD BALANCE	2	- present & future; - cf. Q
10.1 Per capita production and consumption of staple foods and additional foodstuffs in relation to their nutritive value		
at national level	2	- cf. V and W
at regional level	2	
at local level	3	
at farm level	3	
10.2 Results of changes in production	3/5	
F11 INSTITUTIONS	1	- actual and required
11.1 Subjects and programs of agricultural research and rural extension	2	→ P
Geographic	3	
Per land-utilization type, per farm type or per crop	3	
Time schedule	3	
11.2 Interconnection between research and extension	2/3	→ P
11.3 Organization, personnel, and budget	3/5	→ P
11.4 Specific agricultural institutions and/or enterprises which may serve the same purpose, completely or partially	3/5	→ O
11.5 Agricultural education and its impact	3/5	→ O

3. Numerical review of identified activities for CROP PRODUCTION (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	611	21,22,28	(215),811,812
2.2	31	618	29,30,33	
2.3	37,46		34,35,36,39,45	
2.4				
3.1	60,69	651,659	63,64,65,66,67, 68,72,76,105	442,446,448, (657)
3.2	79		83,85,(86),89, (90)(92)	(460)
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	726	131,133,134, 135,136,137	(330),872
5.2		730	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

G. ANIMAL PRODUCTION

G. Montsma

1. Task and interdisciplinary function

Main features of the task

Animal production means the conversion of plant materials into animal products (milk, meat, eggs, labour, wool, manure, etc.). Major concerns are therefore: the feed, the animal, and the product. Each of these three factors shows wide variations, but also has important interactions. These in turn lead to specific farming systems.

It is the task of the discipline* to analyse the animal production situation by:

describing the existing animal farming systems and the major factors underlying these systems

evaluating the present systems

suggesting possible and feasible future developments.

The analysis has to start with the question:

Why does the farmer keep these types/breeds of animal, on these feeds and for these purposes?

After the present situation has been evaluated, the future situation should be indicated, e.g. by comparing the present carrying capacity with that under improved conditions and describing the new inputs that will be required to achieve it.

The demand for animal food (to be indicated by the health discipline) has to be translated into terms of production targets. Together with other disciplines (crop production, fisheries, economics, etc.) these targets will have to be fitted into the total demand for, and supply of, food.

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* *For the division of tasks with the other agronomists, see introductory paragraph of the Crop Production discipline (F)*

Interdisciplinary function

As animal production is concerned with feed, animal, and product, it is usually an integral part of a farming system. These systems are characterised by intensive or extensive use of labour, capital, land, etc., by a high or a low economic risk, by social, cultural or religious factors, and by the presence or absence of a market, to mention some salient points. Animal production therefore has manifold interactions with other disciplines. Development proposals from other disciplines have to be checked for their zoötechnical soundness and vice versa. Therefore, in principle, the discipline should actively participate from the start and continue until at least the third stage.

Professional expertise required

The key aspects of animal production are feeding, health and breeding. The planning team should therefore include an experienced animal husbandry man, if necessary assisted by a nutritionist/agrostologist, and a veterinarian. Again, depending on the importance of animal production in the area, the senior zoötechnician should be a member of the key group. He should be a keen observer, a critical analyst, and a resourceful synthesist.

Usual working methods and sources of information

Working methods for the discipline are not specific. Major information would have to come from numerical data pertaining to the animals, and collected from slaughterhouses, veterinarians, animal production institutes, other disciplines (e.g. crop production, soils, hydrology, and economics), and from interviews with farmers. Usually, however, additional experimental data will be required for the final plan.

Specific constraints

Because of the numerous problems in realizing the potentials in animal production, the discipline representative(s) must be present or at least easily consultable at any stage of the planning. Although many different forms of animal production may be possible as far as climate, soils, water, etc., are concerned, many of them may not be suitable in the light of socio-economic, cultural, or policy considerations. To compose a feasible form of animal production therefore requires a great deal of all-round expertise, a scarce commodity among animal production experts. To find one also

accustomed to interdisciplinary work is rare indeed.

The presence in the region of a research centre for animal production obviously can be of great advantage for collecting basic statistics and other information, particularly if such a centre has been in operation for a fairly long period, say at least five years. In the absence of such a centre, the animal production expert may be seriously handicapped in fulfilling his task.

2. Checklist for ANIMAL PRODUCTION

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
G1 DATA SOURCES		
1.1 International	1	
1.2 National	1	
1.3 Regional	1	
G2 NATURAL ENVIRONMENT	1	
2.1 Climate: temperature (variation!), humidity, rainfall, etc.	2	- as a constr'nt and hazard → A
2.2 Water for animals: quantity, quality, distance	2	- availability for drinking → C
2.3 Natural vegetation and fauna	2	- as a feed and as a hazard → E
2.4 Land and soils, area and quality	2	→ D
G3 ANIMALS: SPECIES, BREEDS AND TYPES	1	- present and potential
3.1 Number per ha, per farm type unit	2	
3.2 Age distribution, male/female ratio, body weights	2	- per animal unit
3.3 Products: meat, milk wool, hides, draught, etc.	2	
3.4 Production level	3	
3.5 Input-output relationships	3	
G4 HUSBANDRY (PER LIVESTOCK PRODUCTION TYPE)	1/2	- under present and improved situation (procedures, implements, inputs, costs, etc.)

Data to be obtained or provided	Stage	Remarks
4.1 Feed supply, quantity, quality and type	2	→ E, F, H, J
4.2 Drinking water, quality, quantity distance	2	→ C
4.3 Control of diseases	2/3	
4.4 Breeding: natural, artificial	2/3	
4.5 Housing	2/3	
4.6 Raising young stock	2/3	
4.7 Collection and transport of products: field - farm, field - market	2/3	
4.8 Storage, conservation, processing	2/3	- on the farm and elsewhere
4.9 Equipment and implements	2/3	- cf. L
G5 FEED SUPPLY	1	
5.1 Regularity of supply	2/3	- seasonal constraints, etc.
5.2 Feed market: forage, offals concentrates, salt	2/3	- cf. W
5.3 Feed conservation, equipment, etc.	2/3	
5.4 Composition forage: energy, protein	3	
5.5 Management of vegetation: grazing burning, mowing	2/3	
5.6 Grassland improvement: legumes, cultivars, leys, etc.	3	- cf. F
5.7 Concentrates		
Crops, by-products, offals industrial wastes	2	
Feed industry	2/3	→ L
Feed additives: minerals, vitamins, antibiotics	3	
Non-protein nitrogen	3	
5.8 Feed analysis and quality control	2/3	
5.9 Comparative costs; feed conversion	2/3	
5.10 Limitations of feeds	2/3	

Data to be obtained or provided	Stage	Remarks
Deficiencies: energy, protein, minerals, vitamins	3	
Excesses: crude fibre, Ca/P ratio, other minerals	3	
Toxic factors, pollution, etc.	3	
C6 HEALTH CONTROL	1	- occurrence and protective measures
6.1 Infectiouns diseases: viral, bacterial, fungal, protozoan and rickettsial diseases	2/3	
6.2 Parasitic diseases		
Ectoparasites		
Endoparasites		
6.3 Hosts for infectious and parasitic diseases	2/3	
Game	2/3	→ E
Domestic animals	2/3	
Man	2/3	
6.4 Immunity and resistance	2/3	
Immunity and premunity against diseases	2/3	
Resistance of disease vectors against chemotherapeutics	3	
Vaccination	3	
6.5 Infertility and breeding diseases	2/3	
6.6 Veterinary care: organization, quality, and extent	2/3	- present and required
C7 BREEDING MANAGEMENT		- present and potential
7.1 Availability of improved animals	2	
7.2 Selection, culling, and castration	2/3	
7.3 Breeding: administration system	2/3	
7.4 Breeding: natural, artificial	2/3	
Heat detection; farmers skill, climate, nutrition	3	

Data to be obtained or provided	Stage	Remarks
On-farm, off-farm; distance to supply	2/3	
Semen; quality and supply	3	
Reliability of insemination; results, disorders, restraints	3	
C8 HOUSING (STABLING)	1	
8.1 Reasons for housing; climate, fuel supply, predators, crop protection, etc.	2/3	
8.2 Types of housing: complete confinement, partial confinement, seasonal confinement	2/3	
8.3 Materials for housing available and required	2/3	
C9 DEVELOPMENT OPTIONS		
9.1 Animal type	3/5	
9.2 Inputs	3/5	
9.3 Feed supply	3/5	
9.4 Other inputs	3/5	
9.5 Farming systems	3/5	- cf. F and W
G10 INSTITUTIONS	2	- present and required
10.1 Research and extension	3	→ P
10.2 Breeding and insemination	3	
10.3 Veterinary care	3	
10.4 Organization, personnel, and budgets	2	

3. Numerical review of identified activities for ANIMAL PRODUCTION (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	612	21,22,28	(215),812
2.2	31	619	29,30,33	
2.3	46		34,35,36,(37), 39,45	
2.4				
3.1	60,67,68,70, 79	652,660	63,64,65,73,76, 105	442,446,448, (657)
3.2			83,85,(86),89, (90)(92)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	725	131,133,134, 135,136,137	872,873
5.2		731	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

H. FORESTRY

E. Cellarius-Lambermont, C.P. van Goor and W. Kriek

1. Task and interdisciplinary function

Main features of the task

The task of the forestry discipline* in regional planning is to provide a dynamic analysis of the actual and potential situation of forestry and forest industries. For that purpose, the forestry expert will make an inventory of the institutional laws governing forestry at national and regional levels, and an inventory of the forest resources (natural and manmade) including all the functions of these forests (timber, fuel, minor forest products, agri-silviculture, grazing, soil and water conservation, nature conservation, recreation, etc.). He will also make an inventory of existing forest industries (with inputs and outputs), and assess present and future production and consumption (including import and export) of wood, woodproducts and other forest products. In addition, he will carry out prefeasibility studies (including marketing) concerning the establishment of the various types of forests and forest industries, and evaluate the potentials of the existing natural and manmade forests.

Interdisciplinary function

Forestry plays an important role in social and economic development. Forests provide raw material for many purposes (e.g. timber, fuel, paper, furniture and construction) and often many different minor forest products. The establishment of forests and forest industries may stimulate the development of the physical infrastructure, any earn and save foreign exchange, and may create employment in rural areas.

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* *For the division of tasks with the other agronomists, see introductory paragraph of the Crop Production discipline (F)*

Forests also play an important role in the protection of flora and fauna and in the conservation of soil and water (regulating stream flow), and hence have a positive influence on agricultural production and water supply. Finally, they have a series of other functions, e.g. agri-silviculture, grazing and fodder for cattle, hunting and recreation. These many aspects mean that the forestry expert will have to cooperate with many members of the planning team in collecting data, e.g. on climate, soil, hydrology, economy and agriculture and in providing those disciplines with relevant information.

Professional expertise required

The type and number of personnel required will largely depend on the physical and ecological nature of the region, its size and the amount of already available data. If many data have to be verified or collected, forestry experts with different specializations may be needed, i.e. inventory, silviculture, economics, and management. For the general orientation in Stages 1 and 2, at least one forestry expert will be needed, after which it can be decided whether other specialists are required.

Usual working methods and sources of information

In the first place, the forestry expert has to collect information from relevant plans (e.g. national and sectoral plans) and from research institutes on statistics, studies, literature, maps, and aerial photographs. Depending on the available time and manpower, the expert will check this information in the field and/or conduct surveys. In every stage, he will evaluate the information obtained.

Specific constraints

The main obstacles to forestry development in developing countries are institutional, i.e. they refer to the status and structure of the forest services, and of agencies concerned with education, research, extension, and with forest legislation (which, for instance, does not adequately regulate private investment in forestry and forest industries, nor ensure sustained yields). Other problems may be shifting cultivation, grazing, and illicit felling. The work of foresters is often handicapped by the inadequate recording of facts and statistics and the absence of proper maps. In addition, there is usually a shortage of staff.

Prerequisites for successfully fulfilling the task are adequate personnel

and sufficient information on forestry in the region and country in question (maps, statistics, planning, etc.), but, above all, a good working relationship with government agencies at all levels.

2. Checklist for FORESTRY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
H1 BACKGROUND TO THE PLANNING	1	
1.1 Formulating possible objectives	1	
1.2 Collecting literature, statistics, etc.	1	
1.3 Collecting maps and aerial photographs	1/2	→ D
H2 INSTITUTIONAL ASPECTS	2	- national, regional, local
2.1 Legislation and rights	2	→ R, U
2.2 Organizational structures and administrative procedures	2	→ R
2.3 Land tenure and ownership	2	→ U
2.4 Financing and taxations	2	→ R
2.5 Planning and implementation	2	
2.6 Statistics (production, import, export, concessions, employment, etc.)	2	= bureau of statistics, forestry dept.
2.7 Research, education, and extension	2	→ O, P
H3 FOREST RESOURCES	2/3	- natural forests; forest plantations
3.1 Inventory		
Area and forest types	2/3	- cf. E
Species	2/3	
Volume (or weight) of wood	3	
Growth (increment)	3	
Drain (natural decay and harvest)	3	
3.2 Functions	2	- actual and potential
Timber and fuel production	2	

Data to be obtained or provided	Stage	Remarks
Soil and water conservation	2	→ C, D
Nature conservation	2	→ E
Grazing and agrisilviculture	2	→ F, G
Human settlements	2	→ N, Y
Shelterbelts and roadside plantations	2	
Recreation and amenity	2	→ N, - cf. L
Hunting	2	- cf. E
Minor forest products	2	
3.3 Minor forest products	2/3	- actual and potential
Fodder	3	- cf. G
Nuts, edible fruits, oils, spices	3	
Essential oils, drugs, dyes	3	
Tannins, shellac, naval stores etc.	3	
Products emanating from insect activity (honey, wax); sericulture	3	
3.4 Environment	2/3	- natural forests; forest plantations
General climatic data	2	→ A
Specific climatic data (hurricanes, lightning, hail, snow, frosts, etc.)	3	→ A
Water relations and requirements	2/3	→ C
Soil, topography (incl. altitude)	2	→ D
Biotic influences	2/3	
Abiotic influences and fire	2/3	
Vegetation types, succession	3	- cf. E
H4 SILVICULTURE	2/3	- actual and potential
4.1 Afforestation	2/3	
4.2 Reforestation	2	
Natural regeneration	2/3	
Artificial regeneration	2/3	

Data to be obtained or provided	Stage	Remarks
4.3 Agrisilviculture	3	- in cooper. with other agronomists (F, G, W)
4.4 Special plantations	3	
Ligniculture	3	
Irrigated plantations	3	- cf. C
Canal or roadside plantations	3/5	- cf. Y
Plantations for minor forest products	3	
Shelterbelts	3	- cf. E
Soil and water conservation	3	- cf. C and D
Dune fixation	3/5	
Afforestation of mine spoils and garbage dumps	3/5	
Plantations for recreation and amenity	3/5	- cf. E and Y
4.5 Choice of tree species	3	
4.6 Collecting, handling, and storage of seed	3	
4.7 Nursery practice	3	
Permanent or temporary	3	
Location and layout	3	
Production of plants	3	
Tending (weed control, fertilizers, irrigation, root-pruning, protection)	3	
Handling, grading, and transport	3	
4.8 Site clearing and preparation	3	
4.9 Planting techniques (incl. timing)	3	
4.10 Spacing	3	
4.11 Tending (weed control, fertilizers, pruning, thinning	3	
4.12 Protection (pests, diseases, grazing, fire)	3	
4.13 Exploitation	3	

Data to be obtained or provided	Stage	Remarks
H5 MANAGEMENT	2/3	- actual and potential
5.1 Objectives	2	- cf. W
5.2 Management systems	2/3	
5.3 Accounting systems and budgeting	2/3	
5.4 Cost-benefit analyses	3/5	- in cooperation with W
5.5 Planning	2/3	
5.6 Employment	2/3	
5.7 Marketing	2/3	- cf. W
H6 FOREST INDUSTRIES	2/3	- actual and potential
6.1 Manufacturing charcoal	2/3	- cf. X
6.2 Pulp and paper mill	2/3	- cf. X
6.3 Saw mill, plywood mill	2/3	- cf. X
6.4 Integrated industries (fibre board, particle board, etc.)	2/3	- cf. X
6.5 Location (infrastructure, water, electric power)	2/3	- cf. Y
6.6 Input and output	2/3	- cf. X
6.7 Marketing	2/3	- cf. X
H7 PRODUCTION, CONSUMPTION, IMPORT AND EXPORT	2	- actual and potential
7.1 Poles, fuel wood, charcoal	2/3	- cf. W and X
7.2 Round timber	2/3	
7.3 Sawn timber	2/3	
7.4 Pulp and paper	2/3	
7.5 Other wood products (plywood, particle board, etc.)	2/3	
7.6 Minor forest products	2/3	
H8 RESEARCH, EDUCATION, AND EXTENSION	2/3	- inventorise and prepare guidelines for future res.
8.1 Site and silviculture	3/5	
8.2 Genetics	3/5	
8.3 Tree breeding	3/5	
8.4 Protection	3/5	
8.5 Management and economics	3/5	- cf. W and X

Data to be obtained or provided	Stage	Remarks
8.6 Technology	3/5	
8.7 Forest labour and techniques	3/5	
8.8 Inventories	3/5	
8.9 Education (university level, technical training courses)	3/5	→ O
8.10 Extension	3/5	→ P

3. Numerical review of identified activities for FORESTRY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	613	21,22,28	(215),811
2.2	31	620	29,30,33	823
2.3	37,46		35,36,39,45	
2.4				
3.1	60	653,662	63,64,66,67,68, 69,74,76,105	657,834
3.2	81,88		79,83,85,(86), (90)	460,461,846
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	721,727	131,133,134, 135,137	872,873,878
5.2		732	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

J. FISHERIES AND AQUACULTURE

C.J.J. Richter and E.A. Huisman

1. Task and interdisciplinary function

Main features of the task

Fisheries concern the harvesting of aquatic animals from a wild stock. Aquaculture concerns the farming and husbandry of freshwater and marine organisms. It is often difficult to distinguish the overlap.

The task of the fisheries expert and the fish culturist in the regional planning team is to provide information on:

- the wild stock of fish available for exploitation in fresh, brackish, and/or marine waters *(fisheries)*
- the possibility of transplanting hatchery-reared fish to semi-natural waters or water enclosures, to be followed by periodic harvesting *(extensive fish culture)*
- the raising of fish in hatcheries, net cages, or ponds *(intensive fish culture)*.

In the early stages of the planning procedure, a rough assessment must be made of the stock of fish available in the natural waters to determine whether or not fisheries or fish culture should be promoted. In the affirmative case, supplementary data must be collected in subsequent stages. Important information for fisheries is that on the hydrology of the waters, the probable distribution of fish by habitat and life history, and methods to optimize catch. Of importance to the fish culturist is information on the quantity and chemical composition of available water during the year, the fluctuations in water temperature, and the permeability of the underlying soil.

The interest of the fisheries expert and aquaculturist should cover the following:

- the assessment of the biological productivity of the water

the rational exploitation of natural fish stocks

the management of natural waters with respect to pollution, diseases, and restocking with hatchery-reared fish

planning the construction of hatcheries and ponds

deciding the species of fish to be used for culture in a particular area

preparing guidelines for the reproduction and feeding of the fish species concerned

the preservation, storage, and marketing of fish

the consequences of intervention by the discipline in the eco-system.

In the planning stages, proposals must be elaborated for legislation on fishing methods (e.g. mesh size for nets) and on the periods of fishing (e.g. closed seasons). Details are also required on such matters as organizing extension services concerning fish farm construction and management, transport of fertilizers for ponds, and collecting agricultural by-products for fish feeding.

Interdisciplinary function

Only general statements can be made about the place of the discipline in the planning process. Given the fact that the scope of activities of fisheries and fish culture is very wide, the experts of this discipline must cooperate with many other team members: architects for fishery facilities, hydrologists and hydraulic engineers for pond construction, food technologists for advice on transport, preservation, and quality control of fish, and economists to study marketing of fish products. Creating ponds and other enclosures for fish culture can cause problems in the form of parasitic diseases such as malaria and bilharzia; if so, specialists in tropical parasitic diseases should be consulted.

Professional expertise required

The type of fishery expert required will greatly depend on the nature of the problems. The fisheries science comprises separate branches: fresh water fish, salt water fish, and subbranches for particular fish species. In aqua-culture, a similar division is made for fish species; but, as this discipline also covers invertebrates such as shrimp, lobster, and mussels, and even sea weeds and higher plants, additional divisions have been made

to include them. Apart from this distinction in taxonomic experts, specialized branches exist for the reproduction of fish, the hatching and nursing of fish, the formulation of feeds, fish diseases, and so forth. In both fisheries and aquaculture, one has to consider the techniques of catching, transporting, storing, preserving, and processing the fish, and their byproducts if any. There are relatively few institutions (universities, technical schools, etc.) that provide a complete fisheries or fish culture curriculum. The few experts available have often received their training in governmental institutions or international organizations, and have either a background in biology or experience in fisheries.

Only after the general field orientation (Stage 2) can a more precise decision be made on the kind(s) of expert(s) that should be included in the regional planning team and on the duration of their assistance to the team.

Usual working methods and sources of information

Most of the necessary information has to be derived from the existing fishing practices in the region. For the fisheries, this would include the collection of data on the fish catches of the fishermen in the region. If these are not obtainable, inquiries among the suppliers of fish to the local markets can be useful.

For fish culture, the applicability of the method must first be investigated by collecting data on the availability and the quality of water throughout the year. Next, the quantity and quality of agricultural by-products and animal offal from slaughterhouses has to be assessed and a rough estimate made of the costs of cultivated fish compared with those of captured fish. For a more complex situation, a pilot plant (of approximately 10 hectares) may be necessary.

Specific constraints

The efficiency of the planning studies may be seriously hampered by the lack of adequate information on the climate (e.g. fluctuations in rainfall), on the hydrology (e.g. fluctuations in water levels) etc.

Incomplete statistics on fish catches and on the production of agricultural by-products could also impede efficiency. The success of fisheries and fish culture, in general, largely depends on the level of education and extension available to the professional fisherman, and on the overall organization of fishing.

2. Checklist for FISHERIES AND AQUACULTURE

Data to be obtained or provided	Stage when data first req'd	Remarks → disc., mainly resp. = source of data - use of data
J1 NATURAL ENVIRONMENT	1	
1.1 Water bodies, quality, temperature regime	1	= data from A and C
1.2 Rainfall, evaporation, changes in water level	1	= data from A and C
1.3 Natural aquatic vegetation and fauna, available food chains	2	
1.4 Genetic resources for breeding	3	
1.5 Pathogens and diseases	3	
J2 FISHERIES MANAGEMENT	1	= from dept. of fisheries
2.1 Assessment of fish stocks (specified per type)	2	- actual and potential
2.2 Legislation on fishing gear, mesh-size, closed seasons, etc.	3	- cf. R
2.3 Harvesting and processing	2	- cf. L
2.4 Stocking and restocking of species	3	
2.5 Environmental control, water quality	2	- cf. C and E
J3 AQUACULTURE MANAGEMENT	1	
3.1 Types of aquaculture, cultured species, soil permeability	2	- actual and pot., - cf. D
3.2 Use of technical inputs, agricultural by-products, fertilizers	2/3	
3.3 Labour and skill, requirements	3	
J4 DEMAND FOR FISH PRODUCTS	1	- actual and potential
4.1 Position of fish (fish types) in the diet; local, regional	2/3	- cf. N and Q
4.2 Present production from: fisheries, and fish culture	2/3	
4.3 Market potential: local, regional, national	3	- cf. L and W

Data to be obtained or provided	Stage	Remarks
J5 INSTITUTIONAL REQUIREMENTS		- existing and required
5.1 Research	2/3	
5.2 Education and extension	2/3	→ O, P
5.3 Organization, personnel, budget	3/5	→ R, - cf. S and T

3. Numerical review of identified activities for FISHERIES AND AQUACULTURE (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	614	21,22,28	(215)
2.2	31	621	29,30,33	
2.3	46		35,36,38,39,45	
2.4				
3.1	60	654,661,663	63,64,75,(76), 105	657
3.2	80		83,85,(86), 88,(90)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	722,728	131,133,134,137	
5.2		733	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

Numerical review of identified activities for MINING[1]
(cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in[2]:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	616	21,22,28	(215)
2.2	31	623	29,30,33	414
2.3	46		40,45	
2.4				
3.1	60	656,664	75,(76)	445
3.2			83,(86)(90),94	451,458
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	724	131,134,137	511,516,729
5.2		735	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

[1] *For the paragraphs (1) 'Task and Interdisciplinary function' and (2) 'Checklist' reference is made to Section B: Geology*

[2] numbers between brackets are to be regarded as optional

L. SECONDARY/TERTIARY PRODUCTION SECTORS

H.I. Pouw, R. Wirtz and P.T. Engelkamp

1. Task and interdisciplinary function

For a classification of the secondary and tertiary sectors be referred to Section X: Economics of the non-agricultural production sectors.
The presentation in the present section has been drawn up with emphasis on the features of the sub-sector Manufacturing.

Main features of the tasks

Technical data for the planning and operation of manufacturing industries are to be provided by industrial engineering and civil engineering disciplines.
The task of the industrial engineering disciplines will cover in the first place *internal* aspects of the enterprise or the project. With respect to the present situation it will be their task to:

- analyse production capacities;
- assess available technical and managerial skills, level of technology and age of machinery;
- investigate transport, storage and handling systems of agricultural and non-agricultural raw materials and processed output, including post-harvest processing and storage.

The industrial engineer will identify technically feasible production processes, as well as their bottlenecks in the light of industrial development targets and he will collect the technical data required for industrial plans. This will result in a listing of industrial requirements that have to be translated into planning objectives for new ventures or proposals for improvement, expansion or diversification of existing industries in terms of:

- production techniques and technology employed;
- managerial, technical and labour training;

maintenance and quality control;
handling, transport and storage;
environmental aspects.

The civil engineering discipline will serve the essential complementary planning tasks in caring for the *external* provisions of the enterprise. This includes assessing the present situation, potentials and bottlenecks for future development, concerning:

physical planning, urban centres and industrial sites,
energy supply,
waste disposal, environmental aspects,
infrastructure for transport and communication,
water supply.

Implementation of projects will largely depend on available capacities in manpower. These capacities and their expansion potential will have to be investigated as well as the present and future availability of local materials to construct buildings and roads. Moreover, assessing future needs in terms of manpower skills, investment and operational costs will be a major task of the civil engineering discipline. See further section Y: Physical infrastructure.

Interdisciplinary function

The economic disciplines require close cooperation between industrial and civil engineers for quite number of studies. In an iterative process one has to decide on the desired agri-business system and other industries. For technical evaluations the industrial engineers will often have to cooperate with other technical disciplines of the primary sector.
In order to optimize the exploitation of agricultural resources, in an early stage contacts have to be established between crop specialists and foodtechnologists. In choosing one of more technologies attention must be paid to available manpower, their skills and attitudes. To identify the consequences for educational programs collaboration is needed with the demographic, social and educational disciplines.

Professional expertise required

In the exploration and fact-finding stage a generalist is needed with extensive experience in processing primary raw material.

For the external aspects the services of a civil engineer with qualifications as mentioned in Section Y, are required.
The size and composition of the team in the stages of investment opportunity and prefeasibility studies will be determined by the specific findings in foregoing stages.

Usual working methods and sources of information

Integrated plant surveys are made to analyse the present situation. Depending on the size of the area, the time and funds available, random samples have to be taken in each branch of industry. Some of these studies will have to be done outside the study region. For technical data needed for new ventures one may have to draw heavily on experience obtained from elsewhere.
In order to identify the locally available expertise for the secondary and tertiary sectors (e.g. managerial capabilities) numerous visits to enterprises may be needed. In this respect manufacturer's associations and local experts can be most helpful.

Specific constraints

In a predominantly rural region, the activities of sectors other than the primary one may be limited; moreover, they may be concentrated in a few urban centres.
If industries are not allied to agriculture, there will be little or no need for technical contacts between industrial disciplines and the primary sector. Evidently the common interest for manpower remains. Experiences from elsewhere can seldom be introduced unadapted in the study area. The time and the appropriate facilities must be found for adaptation and some basic engineering studies.
An industrial engineer should preferably take part in the reconnaissance mission to indicate in an early stage possible developments in the non-agricultural production sectors and to prepare a list of the expertise to be called in at a later stage. However, specialists should not join later than Stage 4 as this would impede the integration of their work.

NOTE.
For this discipline no Checklist is provided because of the great variation in secondary and tertiary sectors of different regions.
Reference is made to the Checklist of the disciplines:

X: Non-agricultural production sectors, and

Y: Physical infrastructure.

2. Numerical review of identified activities for SECONDARY/ TERTIARY PRODUCTION SECTORS (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	617	21,22,28	(215)
2.2	31	624	29,30,33	414
2.3	46		40,45	
2.4				
3.1	60	657,658	63,70,75,(76)	445
3.2			(80),(81),83,(86),(90),93,94,95	450,451,452,457,458,459
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	723,729	131,134,(137)	511,516
5.2		736	140,141	730
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

M. DEMOGRAPHY

D.B.W.M. van Dusseldorp*

1. Task and interdisciplinary function

Main features of the task

To provide the demographic data required for the regional planning the demographer starts, to analyze the present population: its size, structure (population pyramid), and geographic distribution. Subsequently, he projects the future size, structure, and distribution for the time horizon(s) of the regional plan.

Interdisciplinary function

In projecting the future population size, the demographer requires information from the health expert on expected birth and death rates. The population size can also be influenced by any expected future migration pattern which, in turn, are influenced by the carrying capacity of the region. Information on that subject has to be supplied by the production-oriented disciplines. Given the fact that the population is the target group of regional planning, it follows that demographic data are fundamental items of information for the technical, economic, and social/institutional disciplines. Therefore, the demographer should complete his task in an early stage of planning; the data he presents in the Skeleton Report (Stage 3) should, whenever possible, be final.

Professional expertise required

The demographer's relatively simple task in regional planning seldom justifies the inclusion of a demographic expert in the planning team. Depending on their scientific background and experience, the sociologist, economist, or health expert can cover the demographic aspects of planning. If specific demographic expertise is called for during the planning process, it should

* *The author acknowledges contributions by G.E. Frerks*

be obtained from the National Planning Authority, the Bureau of Statistics, or the Population Census Organization.

Usual working methods and sources of information

Regional planning teams have to rely on existing demographic information, which in most cases will be found in the latest population census, although it may have to be updated. If a census is not available, information will have to be obtained from other sources such as records of malaria-eradication campaigns, records of internal revenue departments, records of village councils, or of regional officers of the Ministry of Internal Affairs. In exceptional situations aerial photographs may have to be used.

Specific constraints

The lack of a reliable population census will nearly always result in dubious information on one of the most crucial aspects of the regional plan, i.e. the region's present and future population. This inherent weakness in the regional plan must be emphatically stated, and it should be recommended that one of the first action programs to be undertaken is a population census. In such circumstances, it may even be wise not to proceed beyond the Inception Report (Stage 2) until more reliable population data are available.

2. Checklist for DEMOGRAPHY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
M1 POPULATION SIZE AND DISTRIBUTION, TRENDS		= population census, bureau of statistics
1.1 Population size	1	
1.2 Geographical distribution	1	
1.3 Distribution by sex and age (age pyramid)	2	
1.4 Distribution by occupation	3	
1.5 Distribution by religion	3	- not strictly required, but can be useful
1.6 Distribution by race or tribe	3	
1.7 Distribution by size and type of family	3	

Data to be obtained or provided	Stage	Remarks
1.8 Distribution by type of education. Illiteracy	3	
M2 POPULATION GROWTH, PRESENT AND FUTURE		
2.1 Birth and death rates	1	→ Q, = eventually the health discipline to be asked for estimates
2.2 Age-specific mortality (incl. infant mortality)	2	
2.3 Migration figures	2	
M3 FUTURE SIZE, STRUCTURE AND DISTRIBUTION OF THE POPULATION	3	

3. Numerical review of identified activities for DEMOGRAPHY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	211	21,22,28	(215)
2.2	31	219	29,30,33	
2.3	46		42,45	
2.4				
3.1		251,259	(76)	258
3.2			83,(86)(90)(91), (96)	281
3.3	97,99	283		
3.4			102	
4.	111,113		112,114	
5.1	132	328,332	131,137	329
5.2			140,141	341
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

N. SOCIOLOGY

D.B.W.M. van Dusseldorp*

1. Task and interdisciplinary function

Main features of the task

A knowledge of society and human behaviour is essential in the regional planning process. Regional planning's main and final goal is to improve the well-being of the region's population; at the same time this population will have to implement most of the development activities proposed in the regional plan.

The social discipline has to provide a dynamic analysis of the present social situation which should include:

A description of the social structure and its various elements: family structure, lineages, castes, village structure and factions, socio-economic stratification, power structure, communication patterns, participation patterns in local development projects, etc. This description must make it possible to identify the target groups relevant for the various development programs proposed in the regional plan.

A description of the processes that gave rise to the present social structure (social mobility in the past) and the prerequisites for developing that structure into a future structure that is in line with the goals of the regional plan.

A description of the existing culture (values, normative patterns, religion) and the developments that have recently taken place within it. This description should make it possible to deduce the 'images of the future' prevailing among groups in the regional and local societies.

The dynamic analysis should allow an interpretation of what types of development programs are acceptable to the various groups of the population, where participation can be expected and under which conditions, and which programs can expect opposition and why and from whom.

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* *The author acknowledges contributions by G.E. Frerks*

This information should lead to an insight into the potentials and constraints within the social structure that may affect specific future developments. It will therefore be most valuable information when programs are being drawn up for education, extension, community development, participation, etc.

Interdisciplinary function

Like the macro-economist and the physical planner, the sociologist has an important integrative function in the regional planning process. He has to indicate what kind of developments are acceptable to society in the region or how they can be made acceptable. He must indicate the future social structure that will result from the proposed developments. He has an important task in translating the social goals into objectives and targets. It is therefore recommended that the sociologist be a keymember of the regional planning team.

As early as possible, the sociologist should give his first impressions on the social potentials and constraints that will influence the expected main developments. During the iterative process of planning, these impressions should be translated into firm recommendations. This information must be passed on to most of the other disciplines in the team, with special attention to agricultural economy, agronomy, animal husbandry, health, education, extension, cooperatives, credit, land tenure, and public administration.

These disciplines, in their turn, should inform the sociologist of any social potentials and constraints they have observed during their work in the field. The sociologist can also have an advisory function in setting up and implementing the socio-economic surveys to be conducted by other team members (agricultural economist, cooperative or credit specialists etc.). With his central position, the sociologist should start his activities right from the beginning of the planning process (Stage 1). During Stage 3 he should provide the other team members with his analysis of the present social situation. His active participation proceeds through Stages 4 and 5 until the end of Stage 6, during which time he will be supplying the required estimates of social potentials, constraints, and programs of action.

Professional expertise required

At least one senior sociologist is needed. He must have experience in plan-

ning and in designing and implementing surveys and social action programs. He must be able to collect the social data relevant for the regional plan in the usually limited time available. He must be willing and able to translate his (mainly qualitative) information into a comprehensible (and if necessary quantitative) form for the other team members, and to transform his own data into operational programs of action. He must have some insight into the planning aspects of health, education, extension, public administration, cooperatives, and credit.

Usual working methods and sources of information

The usual techniques are surveys conducted through structured or open-ended interviews. In the regional planning process there is seldom time for extensive social surveys. Often the sociologist has to limit himself to interviews with formal and informal leaders or other informants, and has to rely on his observations in the field.

Any earlier social studies made in the region can be of great value, as can any evaluation studies of development projects that have given attention to social aspects. If the social surveys held within the framework of regional planning cannot rely on sound social research done earlier, they can produce little more than estimates or hypotheses of the potentials and constraints of the social structure. These then have to be tested via research programs that must then form part of the action programs of the regional plan.

Specific constraints

Some of the problems facing the social discipline are the following:

The nature of social research means that results from other regions can seldom be used.

The qualitative nature of many social data makes comparison and integration with other data difficult.

Since human beings and their behaviour are the study subject, the social discipline is often accused of participation in politics. Such an impression should be avoided, but on the other hand the sociologist, and via him the team, must be sensitive to any political implications in the proposals made in the regional plan.

Three more practical problems facing the sociology expert are:

Only seldom are sociologic data from previous studies available

in a digestible form. In most cases the sociologist has to start from scratch.

Often his expertise is requested in too late a stage of the planning process.

The available time and manpower is often too limited. This situation is aggravated because the sociologist is often also responsible for the disciplines of health, education, and public administration.

2. Checklist for SOCIOLOGY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data ← use of data
N1 DATA SOURCES		
1.1 International: libraries	1	
1.2 National: ministry of social affairs, universities	1	
1.3 Regional: interviews	2	
N2 SOCIAL STRUCTURE	1	= census, other statistics
2.1 Kin and neighbourhood groups	2	
Family, clan, tribe	2	
Neighbourhood, village	2	
Countries, regions	2	
Mobility between groups	2	
Strains and conflicts	2	
2.2 Social stratification	2	
Kin and neighbourhood groups	2	
Caste, race, religion, secret society, economic status, etc.	2	
Mobility between strata	2	
Strains and conflicts	2	
2.3 Informal groups or communal associations	2	
Interests: relief, production, ceremonies, festivals	3	
Activities: farming, maintenance of roads, etc.	3	

Data to be obtained or provided	Stage	Remarks
2.4 Formal institutions	2	
Economic: cooperatives, trade unions, etc.	2	→ S
Educational	2	→ O
Religious: churches, temples, etc.	2	- useful when available
Others	2	
2.5 Rural leadership	2	
Basis of selection	2	
Nature of leadership	3	
Methods	3	
Effectiveness	3	
N3 COMMUNICATION PATTERNS AND MOBILITY		- internal and external of village and region
3.1 Mobility rural population	2	
Visits paid to persons	3	
Visits paid to service centres and institutions	3	
Frequency of and reasons for the visits	3	
Migration pattern in the past	3	
Seasonal migration (farm, employment, etc.)	3	
3.2 Visits paid to the rural population	3	
Individuals: family, relatives, etc.	3	
Representatives from extension, institutions, merchants, doctors, etc.	3	
3.3 Mass media influence	3	
3.4 Appreciation of contacts by the population	3	
3.5 Consequences for development	3	
N4 CULTURAL PATTERNS AND IMAGES OF THE FUTURE	2	
4.1 Religion and value system	2	

Data to be obtained or provided	Stage	Remarks
4.2 Consumption pattern	2	
4.3 Motivation pattern	2	
Incentives for social and economic activities	2	
Punishment for activities	2	
4.4 Social calender	2	
4.5 Images of the future of rural population	2	
Goals and objectives		
Major problems present situation in the opinion of the rural population	3	
Possibilities they see to solve these problems	3	
4.6 Nature of developments fitting in the motivation pattern and images of the future of rural population	3	
4.7 Potentials and restraints for social change in view of the proposed developments	3	- as a synthesis
N5 DECISION AND PARTICIPATION PATTERN	2	
5.1 Who is making decisions or participating therein with respect to:		
household or family		
farm or other economic enterprises		
village		
social and economic institutions		
region		
5.2 Place of participation in the value system	2	
5.3 How is participation organized	2	
5.4 Expected influence of participation on proposed developments	3	
N6 SOCIAL ACTION PROGRAMS	2	- present and required
6.1 Social policies: national, regional	2	
Goals and objectives	2	

Data to be obtained or provided	Stage	Remarks
Desired future social structure	2	
6.2 Required social change	3	
6.3 Required action programs	3	
(Re) organization	3	
Personnel: quality and number	3	
Physical facilities	3	
Budgets	3	
6.4 Potentials and restraints for action programs	3	- estimated

3. Numerical review of identified activities for SOCIOLOGY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	212	21,22,28	811
2.2	31	220	29,30,33	
2.3	46	227	34,38,41,42,45	
2.4				
3.1	60,61,62	252,266	63,(76)	251,253,255, 256,267,931
3.2	86,89,91,92	268,274,281	77,78,79,83,84, (90)(93),94,95, 96	(271)(272)(273), 285,286,459,463
3.3	97,99			283,935
3.4			102	
4.	111,113		112,114	
5.1	132	325,333,335	131,136,137	321,328,329,330, 334,336,337,516
5.2	140	341	140,141	345
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

O. EDUCATION

D.B.W.M. van Dusseldorp*

1. Task and interdisciplinary function

Main features of the task

It is the task of the education expert to analyse the present situation and to indicate how the existing educational systems and procedures can be improved to meet the future need for skilled manpower and the social demand for education. In this context, education in its broadest senses is meant and includes formal, informal and non-formal education. Most of the non-formal education will be in the hands of the extension expert.

Once the development strategy for improving the education system has been established, the future structure and size of the educational system have to be estimated, including the number of pupils graduating from the various levels.

The investment and recurrent costs of the educational program, as well as the geographical distribution, have to be indicated. In general, curriculum development for education is beyond the scope of regional planning; it belongs within sectoral planning. Consequently, although required changes in curricula should be pointed out, they need not be elaborated.

Interdisciplinary function

Manpower planning forms an integral part of planned regional development. If the education system is not able to provide the required skilled manpower for such development, the projected development will have to be adjusted to the manpower the system can provide. It is therefore important that in an early stage (Stage 3) the economist and other disciplines supply rough estimates of manpower requirements so as to avoid drastic changes in the projected development in later stages.

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* *The author acknowledges contributions by G.E. Frerks*

The educationist should coordinate his efforts with those of other experts who are planning education and extension in their own fields (e.g. health and agriculture). Close coordination with the extension expert is required in relating informal and non-formal education with formal education. Apart from collaborating with other team members in drafting the plans (Stage 3), the educationist has to ensure that his proposals fit into the national educational policy.

Professional expertise required

Only seldom will a regional planning team have an education planning expert at its disposal. Often, the sociologist has to cover this task. If so, he should be familiar with the basic principles and techniques of educational planning. Specific educational expertise can be acquired from the Ministry of Education at the national and regional level.

Usual working methods, and sources of information

The main sources of information are the demography discipline, the Ministry of Education (future size of primary school population), and other disciplines (future manpower requirements and social demand). In most cases an approach that combines manpower planning and social demand is necessary.

Specific constraints

The practical problems encountered in educational planning are similar to those described for the social sciences:

- data from previous studies are not always available;
- manpower and time are often too limited;
- demographic projections are not always reliable;
- manpower requirements are difficult to relate to the required output of the educational system.

2. Checklist for EDUCATION

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
01 DEMOGRAPHIC DATA		= to be obtained from M → M
1.1 Age pyramid in cohorts of one year	2	
1.2 Birth rate	2	
1.3 Age-specific death rates	2	
02 PRESENT LITERACY OF THE POPULATION		= popul. census or estimates of the ministry of educ.
2.1. % of literacy per age group	3	
2.2. % of literacy man/women	3	
2.3 Geographical distribution of literacy	3	
03 SOCIAL DEMAND FOR EDUCATION		
3.1 What kind of education parents want for their children, per social group and per subunit of the region	3	= interv. parents; applic. for var. school types
3.2 What kind of further education pupils want	3	= interviews or inquiries school pop. and teachers
04 MANPOWER DEMAND FOR EDUCATION		
4.1 Present manpower structure	3	= popul. census, → M, W, X
4.2 Educational level of individuals in jobs or in groups of jobs	3	= population census, → M
4.3 Expected future manpower structure per group of jobs	3/5	→ W, X
4.4 Estimated educational requirements per job or groups of jobs	3/5	= interv. with employers; labour office
4.5 Present structure, function and performance of labour market	3	= labour office
4.6 Em- and immigration of qualified manpower	3	= labour office
4.7 Percentage of teachers leaving their profession	3	= ministry of education

Data to be obtained or provided	Stage	Remarks
4.8 Mobility of qualified manpower between jobs or groups of jobs	3	= labour office
05 PRESENT SCHOOL SYSTEM		= ministry of education*
5.1 Types of schools (courses)	2	
5.2 Their interrelationship	2	
5.3 Entrance qualifications	2	
5.4 Geographical distribution	3	
5.5 Threshold and radius of action per school type	3	
5.6 Boarding facilities		
06 PRESENT SCHOOL POPULATION		= ministry of education*
6.1 Number of pupils per school type	2	
6.2 Number of pupils per class in each school type	3	
6.3 Age of students per class and school type	3	
07 PERSONNEL STRUCTURE		= ministry of education*
7.1 Number of teachers per school type	2	
7.2 Age of teachers per school type	3	
7.3 Qualifications of teachers in each school type	3	
7.4 Pupils/teacher ratio per school type and per class	2	
7.5 Capability and willingness of teachers to perform extra activities in literacy courses or community development	3	= interviews with teachers
7.6 Numbers, qualification, positions, and geographical distribution of administrative staff	3	
08 PERFORMANCE OF THE SCHOOL SYSTEM		= ministry of education
8.1. Dropouts per school type and class	3	
8.2 Percentage of pupils retained per school type and class	3	

* *If other agencies also are providing education, this must be identified during the field study (Stage 3).*

Data to be obtained or provided	Stage	Remarks
8.3 School-leavers with and without diplomas per school type	3	
8.4 Capacity to absorb pupils asking for education (no. of persons with required qualifications that are not admitted) per school type	3	
09 COST ELEMENTS		= ministry of educ. and/or ministry of public works
9.1 Building cost of school buildings (classes) per school type	3	
9.2 Building cost of boarding facilities	3	
9.3 Building cost of other facilities e.g. for sport or administration	3	
9.4 Salaries of teachers per school type	3	
9.5 Salaries of other personnel	3	
9.6 Annual cost per pupil per school type (with and without salaries and building costs)	3	
9.7 Maintenance of school buildings per year and school type	3	
9.8 Annual cost of boarding per pupil	3	
9.9 Transport cost of pupils and teachers	3	
9.10 Housing cost for teachers	3	
010 SOCIAL ASPECTS		
10.1 Attitudes of parents and pupils towards various school types		= interview with parents, pupils, teachers
10.2 Job expectation of parents and pupils	3	= interv. parents, pupils
10.3 Attitudes of teacher towards population	3	= interviews teachers
10.4 Willingness of teachers to accept positions in schools in isolated rural areas	3	= interviews teachers
10.5 Social relation within the school system; teachers/pupils and teachers/administration	3	= interviews

Data to be obtained or provided	Stage	Remarks
10.6 Relation educational system with extension organisation and other institutes	3/5	= interviews
10.7 Social accessibility of various school types	3/5	
011 COURSES (NON-FORMAL EDUCATION)		= ministry of educ. and other agencies
11.1 Types of courses provided (litteracy)	3/5	
11.2 Number of courses, geographical distribution	3/5	
11.3 Number of persons following courses	3/5	
11.4 Dropouts and persons leaving courses with certificates	3/5	
11.5 Staffing of courses	3/5	
11.6 Cost of courses	3/5	
11.7 Entrance qualifications	3/5	
11.8 Relation: courses and formal school system	3/5	
012 CURRICULUM PROFILES, LANGUAGE		= ministry of education
12.1 Curricula per school type	3	- in regional planning, curricula are only taken into account as far as of importance for the proposed planned development
12.2 Are these curricula adjusted to the present and the future social-economic environment?		
12.3 Elements in the curricula of importance for the creation of civic spirit	3	= interviews
12.4 Elements in the curricula of importance for the creation of national unity	3	= interviews
12.5 Language in which the curricula are taught per school type	3	= interviews
12.6 Relation of language used in various school types with languages spoken in pupils' homes	3	= interviews

3. Numerical review of identified activities for EDUCATION (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	213	21,22,28	(215)
2.2	31	221	29,30,33	
2.3	46		45	
2.4				
3.1	60	253,260	(76)	
3.2		269,275,280,284	83,(86)(90)(91)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	321,326,334	131,137	329,516
5.2		343	140,141	341,347
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

P. RURAL EXTENSION

D.B.W.M. van Dusseldorp*

1. Task and interdisciplinary function

Main features of the task

Regional plans usually include a great many activities that are unknown and unfamiliar to the local population. Extension will play a vital role in ensuring that these activities are indeed performed by the local population. The main tasks of the extension expert are:

- to find out and register the main changes that will be required in the local population's activity pattern by comparing the existing activities with those required for the proposed developments
- to find the potentials and constraints in the local population's present motivation and incentive pattern that will affect the new activities to be undertaken
- to draw up extension programs (including the content of the message to be transferred)
- to indicate the extension organization required to implement the proposed extension programs and its relationship with other organizations
- to estimate the number and the qualifications of the personnel needed for the extension programs and to indicate any training programs necessary to have the personnel available in time
- to estimate the required facilities (buildings, transport, radio stations, printing equipment) and their geographical distribution.

Interdisciplinary function

The planning task for extension can start only when the other disciplines have indicated the innovation that has to be introduced to realise the proposed development. This means that the planning of extension takes place

* *The author acknowledges contributions by G.E. Frerks*

at the end of the planning process (starts at the end of Stage 3). The team member responsible for extension should maintain close contact with

the sociologist who should provide him with information of the motivation and incentive pattern;

all those disciplines that are proposing innovations (agronomy, agricultural economics, cooperatives, credit, health secondary production sectors) and

the education discipline in order to integrate the formal and non-formal educational systems.

Professional expertise required

In large regional planning teams a specialist on extension may be available. In small regional planning teams the planning of extension activities should be handled by the (rural) sociologist or agricultural economist.

Usual working methods, and sources of information

Extension is an applied social science and the techniques and working methods used are the same as those of the social discipline. Important sources of information are existing extension organizations and evaluation studies of extension programs implemented in the past.

Specific constraints

Lack of sociological data relevant for the planning of extension programs is often a considerable constraint. As the extension discipline has to rely on information from other disciplines, it often has to face problems in delivering its contribution to the regional plan on schedule because of the late receipt of information from other disciplines.

2. Checklist for RURAL EXTENSION

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
P1 PRESENT PATTERN OF ACTIVITIES		
1.1 Existing farm technologies	2	= obtain from → F, G, H
1.2 Existing farm types	3	= obtain from → W
1.3 Existing organizations involved in agricultural development and the activities they perform	3	= obtain from → O, R, S, T, U

Data to be obtained or provided	Stage	Remarks
P2 PRESENT SYSTEM OF VALUES AND NORMS	3	= obtain from or collected in cooperation with → N
On what is the existing pattern of activities based;		
what are the motivation and incentives for these activities		
P3 EXISTING EXTENSION ORGANIZATION		→ R; collect part of the information with → R, in ministry of agric. and dept. of extension
3.1 Structure (organization chart)	1	
3.2 Place in ministry of agriculture	2	
3.3 Relationship to other organizations (education, research stations, etc.)		
3.4 Present personnel with their qualifications and distribution over the region	3	
3.5 Relation: extension service and population (social accessibility)	3	
3.6 Physical facilities available	3	→ Y
3.7 Location of services, threshold values, and radius of action	3	→ Y
P4 EXISTING EXTENSION PROGRAMS		
4.1 Goals and objectives	3	
4.2 Content of the message	3	
4.3 Methods used to transmit the message	3	
4.4 Media used	3	
P5 PROGRAM OF ACTION		
5.1 Proposed new technologies	3	= to be obtained from → F, G, H, J, W
5.2 Proposed new farm types	3	= to be obtained from → W
5.3 Content of the message	3/5	
5.4 Methods proposed to transmit the message	3/5	
5.5 Media to be used	3/5	

Data to be obtained or provided	Stage	Remarks
5.6 Future extension organizations	3/5	
5.7 Personnel required	3/5	
5.8 Physical facilities required and their location	3/5	
5.9 Budget	3/5	

3. Numerical review of identified activities for RURAL EXTENSION (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	213	21,22,28	(215)
2.2	31	221	29,30,33	
2.3	46		45	
2.4				
3.1	60	253,260	(76)	
3.2		269,275,280, 284	83,(86),89, (90)(91)(92)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	321,326,334	131,137	323,329;516
5.2		343	140,141	341,347,730
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

Q. HEALTH

R. Slooff and F.L. Pelt

1. Task and interdisciplinary function

Main features of the task

Health planning means planning not only for health services with their staff, equipment and buildings, but also for the social changes necessary to make such services more effective. Even in this strictly sectoral sense, an interdisciplinary approach, in which health and the social sciences collaborate closely, is called for.

Within the total package of health services to be incorporated in the development plan, an attempt should be made to distinguish the following three categories of measures:

- those needed to remove development constraints (heavy incidence of malaria, prevalent iron-deficient anaemia, etc.) which are considered *primary productive prerequisites* for development;
- those needed to prevent or remedy foreseeable unfavorable side-effects on the health status of the people, which are considered *secondary productive prerequisites* for development;
- those measures which may not contribute to the productive aspects of development, but which may be seen as *social acquisitions* (for example running water, sewers, etc.), financed from economic progress resulting from the project.

Interdisciplinary function

As health, or the lack of it, is closely linked with development, health planning must be part of any regional development effort. There should be a continuous exchange of ideas between health planners and those responsible for the planning in other sectors. The ultimate objective of all should be to provide conditions which secure and maintain optimal levels of well-being for the people living in the region.

In the early stages of the study, the health discipline should provide a

description of the existing situation, which should include an analysis of the following:

- the nature of morbidity and the most common causes of death, including quantitative aspects;
- government policy towards health;
- the means available for health services;
- the constraints that may occur in the health service system.

The health situation must, of course, be known in order to define what types of health services must be planned for. The same is true for knowledge on other determinants of health, which may be behavioural (including cultural and religious), biological, and non-biological, and which all require inputs from other disciplines (sociology, biology, hydrology, etc.). An understanding of the health situation is vital for the planners in other disciplines as well, because the health situation of the labour force is an important factor in determining the potential for development.

Regional policies on health are, in part, derived from national policies; scarce resources force national health ministries to set priorities and to make choices. Such decisions are not necessarily political, but they may be. If they are, discussions with the national government departments will clarify the situation. This, in turn, will be helpful in the design of a health plan which should not only be technically sound but also politically acceptable.

The descriptive analysis should thus serve to pinpoint the most important aspects of health and disease in the region and to define the limitations that prevail in terms of coverage, accessibility, and quality of services. It may well be that sufficient data are not readily available. In such a case, the health discipline should define ways and means of collecting the most essential information at some stage after completion of the Inception Report.

After the health expert has thus presented to the other members of the team a description of the de facto health situation, there should be discussion within the whole team on all possible development options. The health discipline should contribute to this discussion by clarifying the place of health in the overall planning effort. If a poor health status would appear to be an obstacle to productive development, specific measures should be designed

to improve it. If certain types of land and/or water development are considered in the agro-economic sector, it may be necessary to anticipate threats to human health and to define appropriate action. The expected cost of additional measures should be incorporated in cost-benefit analyses for the various alternative development options.

In contributing to the final regional development plan, the health discipline should take care to stay within politically and economically realistic limits. This means that due attention must be given to long-term government health policy; to resources, such as finances and manpower, which may be expected to be available for the health sector; and to future trends in the distribution of population, health patterns, and health demands.

Professional expertise required

In a regional planning team, the health discipline should ideally be represented by an experienced medical doctor specialised in public health, or by a medical sociologist, a health ecologist, or some other expert with knowledge of health planning procedures. Depending on the status of health planning at the regional level, it is also possible that no special health expertise is required. In such cases, the task may be combined with the demographic and/or social sciences aspects of the planning process.

Usual working methods, and sources of information

With the exception of some widely spread and often prevalent diseases such as malaria, most health problems are not easily quantified by a survey among the target population. Consequently, the health discipline will obtain its data from interviews with government and non-government health workers at various levels and with official and non-official leaders in the community, and from whatever statistical information has already been procured locally. The reliability of these data should be taken into consideration.

Specific constraints

The practical problems encountered in health planning are similar to those described for the social sciences:

Data from previous studies are seldom available in a useful form; most work must start from scratch.

The health expertise is often requested in a too late stage in the planning process (if at all).

The manpower and time available are often too limited.

2. Checklist for HEALTH

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
Q1 DEMOGRAPHY		
1.1 Orientation on main characteristics	1	= to be obtained from → M
1.2 Population size, age, and sex structure	2	
1.3 Birth and death rates	1	
1.4 Spatial distribution	1	
1.5 Migration patterns	3/4	
Q2 HEALTH STATISTICS		
2.1 Orientation on main characteristics	1	
2.2 Available data on morbidity and mortality	2	
2.3 Available data on nutrition	2	
2.4 Available data on sanitation	2	
Q3 ECONOMIC ASPECTS		
3.1 Economic loss due to health situation	2/3	= data to be obtained from economic disciplines
3.2 Health problems related to industry, if any	2/3	
Q4 SOCIO-CULTURAL ASPECTS		
4.1 Attitudes, beliefs, practices related to health and disease	2/3	= obtain data from → N
4.2 Social accessibility of health services		
Q5 ENVIRONMENTAL ASPECTS		
5.1 Biological factors affecting health (vectors, reservoirs, etc.)	2/3	= obtain data from → E
5.2 Non-biological factors (water and sanitation, climate, pollution)	2/3	- cf. Q3 Health problems related to industry

Data to be obtained or provided	Stage	Remarks
Q6 HEALTH SERVICES		
6.1 Governmental policy, priorities	1/2	
6.2 Actual health care system(s): national, regional, governmental, private	1/2	
6.3 Staff and training program	2/3	
6.4 Funding and planning system	2/3	
6.5 Legislative aspects, if any	2/3	
6.6 Threshold values and radius of action of services	2/3	
6.7 Spatial distribution of services (map)	2/3	
Q7 COST ELEMENTS		
7.1 Cost of health services	2	
7.2 Salaries of personnel	3	
7.3 Maintenance costs of services	3	
7.4 Other recurrent costs	3	
7,5 Treatment cost per patient	3	
Q8 CONSTRAINT ANALYSIS	2	= data of Q1 to Q7, as far as available
8.1 Physical		
8.2 Biological		
8.3 Cultural		
8.4 Educational		
8.5 Economic		
Q9 DEVELOPMENT OPTIONS	2/3	= from whole team
9.1 Disease pattern	3	
9.2 Nutrition (food, quantity & quality)	3	- cf. F and G
9.3 Environmental aspects	3	
9.4 Health care programs (preventive, curative)	3	
Q10 FORMULATION OF HEALTH SECTOR PLAN		- as part of the regional development plan

Data to be obtained or provided	Stage	Remarks
10.1 Manpower	5	
10.2 Finances	5	
10.3 Structures, physical facilities, and their location	5	
10.4 Programs	5	
10.5 Integration with higher echelons	5	

3. Numerical review of identified activities for HEALTH (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	214	21,22,28	(215),811,812
2.2	31	222	29,30,33	
2.3	46		45	
2.4				
3.1	60	254,258,261	74,75,(76)	446
3.2		270,276,279	83,(86),88,(90),(91)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	327	131,137	329
5.2		344	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

R. PUBLIC ADMINISTRATION

D.B.W.M. van Dusseldorp*

1. Task and interdisciplinary function

Main features of the task

The task of the public administration discipline is to provide a dynamic analysis of the present public administrative system, its involvement in the development process, and the part it will play in the planned development process. On the basis of this analysis, programs of action must be made that result in a public administrative system that is capable of coordinating at the regional level the planning, acceptance, budgeting, and implementation of the local plans and projects of the various ministries.

The proposed programs of action must also pay heed to the participation of the population at the local and regional level in preparing, accepting, and implementing the planned development process. A simple reason for this being that by far the greatest number of implementation activities must be performed by the local population. Without the population's cooperation no development will ever take place.

If a participation relevant for the population and workable for the government is developed it will further the spirit of self reliance which is particularly important in countries where government resources are limited. Usually much time is needed to prepare such a participation pattern and have it followed by the local population, their leaders and the government officers at all levels of the administration.

Interdisciplinary function

The expert in charge of public administration should collaborate with the teammembers who are working with different ministries. In doing so he will obtain relevant information on the organizational pattern of the ministries

* *The author acknowledges contributions by B.T. Mook and G.E. Frerks.*

and their departments. The said teammembers should be given a checklist for data collection for the public administrative discipline.
A public administration specialist forming part of the team will collect the majority of these data himself. However, to avoid duplications in data collection he should consult regularly with his team colleagues. The expert for public administration should focus his attention to ministries or departments charged, now or in the future, with the coordination of development activities at the regional level. It depends on the administrative structure of the country which organization will be responsible for this coordination function. This could be the ministry of national or of home affairs, the ministry of local government, the ministry of national and rural development, the revenue department or a state government. Close cooperation with the sociologist is needed for collection of information concerning the informal structure of the administration, the existing pattern of representation and participation of the population at the local and regional level. Close consultation with teammembers working with ministries such as agriculture, health, education and others is a must to prepare proposals for adjustment of administrative structures and procedures. For the selection of provisional project proposals, the implementation capacity should be taken into account. That is why the public administration expert must provide as early as possible a first assessment of the potentials and constraints of the existing administration.
The potentials for people's participation should likewise be mentioned at an early stage because of its possible influence on the design of projects and on the procedure for their detailed planning, acceptance and implementation.

Professional expertise required

The expert responsible for public administration and participation should be well versed in public administration, with special knowledge of development administration. He must also have an insight in political sciences with emphasis on participation patterns of the population at local and regional levels. For the elaboration of a large or complicate regional plan (requiring a team of some 15 experts), a public administration expert is considered indispensable. In orientating planning stages of smaller teams (up to 10 experts) the sociologist will take over the responsibility for

this field, making every possible use of the knowledge of administration and political sciences available at the regional or the national level.

Usual working methods, and sources of information

Since planned regional development plays an important cross function between the strategies at the national level (national and sectoral plans) and the technical plans (local plans/projects, etc.) at the local level, the public administrative discipline must have an insight in the administration systems at national, regional and local levels. Attention must be paid to formal relations of the various systems with their respective hierarchies, communication and procedural patterns as they are usually given in organizational charts, as well as to the informal relation systems. This should indicate how the actual stream of information and instructions is flowing through the administrative system. In reality information and instruction often bypass or flow through other channels than is indicated in organizational charts.

The formal organization structures can be obtained from the organization- and method bureaus of the ministries or of a central Development Administration Unit. The names of the organizational entities may differ from country to country.

The informal structure can only be obtained from pertinent studies on the Administration, or via interviews of persons who are posted at the most important lines of communication between the various levels and at the regional or local level between ministries or departments.

Information on formal participation patterns can be obtained from the ministry of internal affairs. Information on informal participation patterns at local level should be obtained via the sociologist, on the basis of his enquiries.

Specific constraints

Information on the formal structure and the functioning of the administration and participation pattern is in most cases readily available. Information related to the informal functioning of the administration is normally not available and its collection is difficult and should be done with great care.

Proposed changes in the administration and its procedure usually require adjustments at the national level.

2. Checklist for PUBLIC ADMINISTRATION

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data – use of data
R1 FORMAL ADMINISTRATIVE STRUCTURE	1	
1.1 Organizational charts of ministries and departments relevant for development of the region	2	= organization and methods bureaus of ministries
1.2 Functions of the ministries and departments: regulation, coordination, education, providing services, providing and maintaining physical structures, etc.	2	= organization and methods bureaus of ministries; administr. development unit
1.3 Division of the functions over staff at regional and local level	3	= officers at local and regional level
1.4 Budget control; what % of the budget originates from national, regional local level	3	= heads of departments at regional level
1.5 Organizational control	3	= per dept. at national and regional level
Do the regional and local levels obtain detailed instructions from above		
Are local and regional levels allowed freedom to adapt and adjust national and regional policies and plans	3	= per dept. at national and regional level
1.6 Communication patterns	3	= per dept. at reg. level
How does communication take place: via memos, reports, etc., via meetings, via verbal information to superiors, colleagues, subordinates		
What kind of information is given to superiors, colleagues, and sub-ordinates	3	= per dept. at regional and local level
What is done with this information	3	= per dept. reg.; local level
Availability of telephones	2	= telecommunication dept.
Availability of type- and repro-machines	3	= budget dept. observation

Data to be obtained or provided	Stage	Remarks
Availability of clerks	3	= personnel charts
Availability of transport (cars, motorbikes, bicycles)	2	
1.7 Interdepartmental communication and coördination		
What personnel is giving what information to whom in other departments. In what form does it take place and with what frequency	3	= interviews
Is the interdepartmental communication institutionalized. Obligatory meetings, with agendas, at regular intervals	3	= interviews and organiz. charts
Who is responsible for the preparation and chairing of those meetings	3	= interviews
What decision powers have those meetings (coördination power)	3	= rules and regulations
Who are informed of those decisions and how	3	= interviews
How are the various planning and implementation activities integrated	2	= interviews
1.8 Intra-departmental communication and coördination		
What personnel is giving what information to whom in the dept. In what form does it take place and with what frequency	3	= interviews
Are there regular meetings in the dept, and between its organizational units	3	= interviews and organz. charts
Who are responsible for preparing and chairing the meetings	3	= interviews/org. charts
What are the items (agenda)	3	= interviews/org. charts
What decisions can be made at those meetings	3	= regulations/procedures
Who are informed of those decisions	3	= interviews
What is done with those decisions	3	= interviews

Data to be obtained or provided	Stage	Remarks
How strong is the hierarchy within the ministry. Is there a great amount of decentralization or considerable centralization of decision power and at what levels	2	= org. charts, regulations, procedures; interviews
How are the various planning and implementation activities integrated	2	= interviews
1.9 Extra-departmental communication		
Has the dept. contact with elected councils, firms, local population	2	= interviews
What is the nature and frequency of these contacts	3	= interviews
What information is obtained via the contacts; how is it channelled into the department	3	= interviews
What is done with this information	3	= interviews
What is the attitude of the personnel in the dept. towards the various contacts with councils, firms, local population	3	= interviews
1.10 Other organizations involved in planned development	3	
Their functions and tasks		
Their organization		
Their relation with the administration		
Size of funds available to those organizations		
1.11 Maps showing boundaries of the public administrative units and the location of the physical facilities	2	= administr. dev. unit
1.12 Threshold values and radius of action of public administrative services	3	= administr. dev. unit

Data to be obtained or provided	Stage	Remarks
R2 INFORMAL STRUCTURE		
2.1 What kind of contacts and information exchange takes place outside the structure and procedures indicated in the formal structure	3	= interviews
2.2 Are the informal contacts and information exchange strengthening or weakening the formal structure	3	= interviews
2.3 Is the informal structure promoting or impeding inter-, intra-, and extra-departmental communication	3	= interviews
2.4 Value system in regard to the adm. organization (integrity, loyalty, etc.)	3	= interviews
R3 PERSONNEL ISSUES		
3.1 What are the salaries of the various positions in the administration	3	= personnel office
3.2 What are the requirements for each position relevant for development	3	= personnel office
3.3 How does promotion take place	3	= personnel office
3.4 Personnel transfer pattern	3	= personnel office, interviews with heads of depts & personnel
Frequency		
Always within the region		
Also outside the region		
What are reasons for transfer of personnel		
3.5 Are there incentives beyond salaries	3	= personnel office, interviews heads of depts & personnel
Housing and transport allowances or facilities		
Hardship allowances		
Promotion prospects after assignments to remote field stations		
Availability of socio-economic services		

Data to be obtained or provided	Stage	Remarks
3.6 Training programs	3	= interviews, collect material on the training programs
Preceding entrance service		
On-the-job training		
Mid-career courses		
R4 PLANNING ACTIVITIES OF THE ADMINISTRATION AT VARIOUS LEVELS		- to be investigated conjointly with R1 to R3
4.1 How are activities for development planning organized	1	
4.2 Task and position of planning agencies and sections	2	
4.3 How are goals and objectives presented to planning agencies	1/2	
4.4 How are data for the planning obtained	1/2	
4.5 Procedures for the plan information	2	
4.6 Procedure of accepting newly prepared plans	2	
4.7 Procedure of the plan evaluation (internal, external, interim, and end evaluation)	2	
4.8 Mutual relations between the various planning agencies and sections	2	
4.9 Relations between planning agencies and their principals, with respect to data collecting, implementing, and evaluation	2	
R5 PARTICIPATION AND REPRESENTATION PATTERN		
5.1 What is the representation pattern: state parliament, province, village, parish, councils	1	= national legislation
5.2 How are the organizations for popular representation and participation established	2	= national and regional legislation
5.3 What are the legislative and budgetary powers of the various bodies	3	= national and regional legislation

Data to be obtained or provided	Stage	Remarks
5.4 If they have budgetary powers, where does the money come from	3	= department of finance and related bodies
5.5 What is the attitude of the population towards the bodies representing them	3	= interviews, conjointly with N
5.6 Are there (at local or regional level) informal bodies representing the population or groups of the population	3	= interviews, conj. with N
5.7 How are the relations between the formal and informal bodies representing the population	3	= interviews, conj. with N
5.8 How are the contacts and relations between the various parts of the administration and the representative bodies	3	= interviews, conj. with N
5.9 How strong is local leadership	3	= interviews, conj. with N
5.10 How much are local leaders involved in representative bodies	3	= interviews, conj. with N
5.11 Social accessibility of public administrative services	3	= interviews, conj. with N
R6 ACTION PROGRAMS		
6.1 Goals and objectives	2/3	
6.2 Description of the desired future organization of the administration	3/5	
6.3 Administrative changes, if required	5	
6.4 Action programs		
Activities proposed and time schedule	5	
Legislative requirements	5	
Personnel consequences, quantity and quality	5	
Physical facilities needed and their location	5	
Budgets	5	

3. Numerical review of identified activities for PUBLIC ADMINISTRATION (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	215	21,22,28	811
2.2	31	223	29,30,33	
2.3	41,46		45	
2.4				
3.1		262	(70)(76)	252,257,446
3.2	87	285,286	79,80,83,(86)	268,346
3.3	90,97,99		91,92,93,95	935
3.4			102	
4.	111,113		112,114	
5.1	132	329,335	131,137	333,338
5.2		345	140,141	341,348,876
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

S. AGRICULTURAL COOPERATIVES

F.J.A. Bouman

1. Task and interdisciplinary function

Main features of the task

In the Western Hemisphere, the cooperative movement originated at grassroot level and developed bottom upwards. Initially neutral governments allowed spontaneous growth in accordance with the cooperative principles of autonomy, equality, autofinancement and self-help. Legislation followed rather than preceded the cooperative movement.

In the Third World, governments act as initiator, financier, legislator, and manager of cooperative organisations. Although attributing to the cooperative the role of catalysing agent in the development process, governments actually have taken this role upon themselves. While still endorsing the cooperative principles of autonomy and self-reliance, the resulting strategy emerges as ambiguous and confusing.

It will be the responsibility of the cooperative consultant in the planning team:

to put government policy and strategy and the popular reaction in the region in their proper perspective. Although cooperative policy papers delimit the official public objectives, the interpretation of such objectives at national and regional level differs greatly between administrators and the officials and members of cooperatives;

to assess the efficiency and significance of regional primary and secondary cooperative organizations in comparison to that of private and public enterprise in the fields of agricultural production, credit, input supply, and the marketing and processing of produce;

to assess the degree of success of the cooperative to put in operation under-utilised human and economic resources in a broader development context of improving the living and working conditions of the rural population;

to identify constraining factors in the development of cooperative enterprise;

to assist in eventual reformulation of cooperative strategy in the specific regional context of socio-economic potentials and constraints and to reconcile this strategy with national development objectives.

Interdisciplinary function

It is the task of technologists and economists to determine the optimum use of scarce resources in agricultural production. The ensuing message is translated by social scientists into structures of human organization. The agricultural cooperative is but one of many forms of mobilizing human manpower. The cooperative is both an economic enterprise and a form of human organization. Success as an enterprise depends on economic and organizational viability; to succeed as a human organization, members must be motivated. Here, the point is to have a purpose that is readily understood, that has an obvious, demonstrable benefit, and bears little or no risk to those who are involved.

Cooperatives do not operate in a vacuum but reflect pertaining social and hierarchical structures, tribal and local parochialism, and the degree of managerial abilities of their leadership. Rather than being a prime mover within, cooperatives are a corollary of the physical and socio-economic environment in which they operate. As such, cooperatives have a message to convey to the planning team.

It is the task of the cooperative consultant to assess how the local and regional agricultural cooperatives are performing their allotted functions. Key-concepts in this evaluation are economic, social, and organizational viability. His observations have then to be put into a broader frame of reference as he examines:

whether, as an economic institution, cooperatives in the region can compete successfully with other, private and public, enterprises; and

whether, as a form of human organization, cooperatives are a proper instrument to introduce required changes in the socio-political framework of the region.

Professional expertise required

From the above, it is clear that a cooperative specialist should be conversant with both the economic and social disciplines and techniques. Whether

available manpower within the planning team can adequately cover the cooperative sector depends on the number and types of existing cooperatives in the region, the emphasis that the national and regional authorities put on the cooperative as agent of change, and the type of information required and at hand. In a region where the cooperative movement is still dormant, a superficial survey/evaluation of the cooperative structure and performance could be carried out by either the rural economist or sociologist with the assistance of local personnel.

Where both cooperative policy and *actual* performance are obviously significant in the regional development context, a cooperative consultant should be included in the team. He could either serve on a temporary basis for this specific task or be fully included in the planning team and be charged with the broader assignment of surveying other private and public rural institutions operating in related fields (agricultural production, credit, input supply, marketing, extension).

Usual working methods and sources of information

There is no standard procedure to evaluate the efficiency and significance of cooperative enterprise. The cooperative has an ideological as well as a practical dimension. Both are borrowed from the Western culture without a proper frame of reference - there is no direct continuum between modern and traditional concepts of cooperation.

Role perceptions of public authorities, cooperative officials, and common membership thus gain major importance and should be assessed in an early stage. Eventual differences in role perceptions may be a significant constraint for a harmonious development of the cooperative movement. The usual method here is the personal interview, as applied by the social sciences.

The main objective of an agricultural cooperative is to serve the economic interests of membership through the application of economies of scale and through the strengthening of members' bargaining position in the market economy. But no cooperative can compete successfully with private enterprise without being adequately equipped organizationally, financially, and infrastructurally (storage, warehousing, marketing, transport, processing). A regional survey of cooperatives will concentrate on the general type of facilities and will determine the nature of any shortcomings. Other criteria to evaluate the social, organizational, and economic viability of the cooper-

ative movement are enumerated in the checklist.

The methodology applied is a mixture of the procedures used by the sociologist, economist, and the management consultant.

Specific constraints

Lack of data is often a constraint when the success of cooperatives is only measured in statistical terms. Most of the common types of statistical data, however, reveal only symptoms - and symptoms are not to be mistaken for underlying causes of success or failure.

The main difficulty in assessing its proper significance is that the cooperative often remains clouded in the realm of slogans and ideology. If cooperatives are meant as a means of transforming traditional social and economic structures, ideology should be translated into practical operational terms that can really motivate the masses.

The use of cooperatives as a platform for political aspirations is a serious handicap for a planning team that is to outline a future development strategy. Parochialism that defines the functions of the cooperative only in terms of limited local interests is another.

2. Checklist for AGRICULTURAL COOPERATIVES

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
S1 DATA SOURCES	1	
1.1 International: libraries, ILO, ICA	1	
1.2 National: libraries, government, coop. apex organizations	1	
1.3 Regional: government, cooperative records	2	
S2 HISTORICAL REVIEW COOPERATIVE MOVEMENT	1	
2.1 Legislation and ideology	1	
2.2 Objectives	1	- comparison: national, group and individual goals
as interpreted by government	1	
as interpreted by cooperative officials	1	

Data to be obtained or provided	Stage	Remarks
as interpreted by members	1	
2.3 Success and failure	1	
S3 SOCIAL AND ORGANIZATIONAL VIABILITY COOPERATIVES		
3.1 Identification of coop. policy with membership problems	2/3	
3.2 Intervention and control by government	2/3	
3.3 Power structure	3	
Coop. leadership: profile, objectives	3	
Participation of membership in coop. policy; attendancy at meetings	3	
Degree of control of management by members	3	
Factionism of board and membership	3	
Political involvement	2/3	
3.4 Cultural pattern in relation to coop. ideology	2/3	- is coop. ideology in acc. with the cult. value & relig. system? - Cf. → N
3.5 Loyalty, solidarity, and discipline of members	3	
Knowledge of and adherence to rules, procedures	3	
Degree of patronage	3	
Repayment of debts	3	
Distance to coop. facilities	3	
3.6 Managerial competence	3	
In business and administration	3	
In relationship with members	3	
Training and education within cooperative	3	

Data to be obtained or provided	Stage	Remarks
S4 ECONOMIC VIABILITY COOPERATIVES	1	- present and potential
4.1 Number and type of cooperatives	2	
Membership: number and type (subsistence, small, big farmers, etc.)	2/3	
Spatial distribution of the coop's	2/3	
Degree of patronage	2/3	
Recent registrations and liquidations	2/3	
Recent amalgamations	2/3	
Number and type of dormant societies	2/3	
4.2 Growth cooperative funds: shares, deposits, reserves	2/3	
4.3 Type and volume of business (growth, decline)	2	- as a measure of cost-covering capacity
Storage and processing	2/3	
Marketing of produce	2/3	
Availability of credit	2/3	
Supply of inputs	2/3	
4.4 Profit/loss accounts	2/3	
4.5 Quality of services provided		- in rel. to services prov. by private entrepreneurs; cf. → X
Regularity of supply. Price fluctuations	2	
Service charges	3	
Prices for products	3	
Administrative procedures	3	
S5 POTENTIAL ROLE COOPERATIVES	2	- as a synthesis
5.1 Regional gross agricultural production	2/3	= to be indicated by → W

Data to be obtained or provided	Stage	Remarks
5.2 Regional volume of business: marketing, processing, transport, inputs, etc.	3/5	
5.3 Type of supporting services to be performed by cooperatives	3/5	- after identification of membership needs; cf. → X
Personnel: number and skill	3/5	
Physical facilities: their location	3/5	
Budget and financial support	3/5	

3. Numerical review of identified activities for AGRICULTURAL COOPERATIVES (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	216	21,22,28	(215)
2.2	31	224	29,30,33	
2.3	46		45	
2.4				
3.1	60	255	63,(76)	446
3.2	77,84	271,277	83,(86)(90)(91)(92)(95)	268
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	322,330,336	131,136,137	323,329
5.2		346	140,141	347
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

T. AGRICULTURAL CREDIT

F.J.A. Bouman

1. Task and interdisciplinary function

Main features of the task

It is the task of the credit specialist to analyse the effectiveness, efficiency, and significance of both the institutional and non-institutional credit markets in relation to the existing credit needs in the region. On the basis of this analysis he provides recommendations for future credit operations.

The following aspects are taken into consideration:

the demand dimension

the extent and nature of the credit demand: sectors of influence (land tenure arrangements, market and price policies, agricultural and technological development potential, social and religious obligations);

debt-carrying capacity of farm households;

saving potential of farm households;

accessibility to credit markets;

perception of the role of credit markets.

the supply dimension

access to (a continuous supply of) loanable funds;

utilisation of loan-making potential, during both the agricultural loan season and the off-season;

composition of loan portfolio (type of credit and category of beneficiaries);

procedures for loan application, decision-making, disbursement and collection of loans;

terms and conditions of loans, per category; criteria for loan basis;

consistency between credit policy and development program: credit promotion for crops recommended in development program.

Interdisciplinary function

Agricultural credit cannot be isolated from the socio-political context in which it operates. This context determines the objectives, costs, and success of credit programs. Objectives of credit programs may be production- or welfare-oriented. Welfare-oriented credit aims primarily at an income transfer, not at increased agricultural production. To accomplish such transfers, only nominal interest is charged and no debts are collected. This raises the issue of opportunity costs of credit funds, which is more a socio-political than an economic issue. In the context of regional development planning, the emphasis is, however, on production-oriented credit.

The interest of the credit specialist centres on the following questions (information to be obtained, in part, from, or to be collected in collaboration with, other disciplines):

> How do land tenure arrangements influence the motivation of farmers with respect to investment?
>
> How do market and price policies influence the economic return of farm investments?
>
> How does the potential for development (climate, soil, and water) and for technological innovation influence the investment returns?
>
> How does the existence of an extension service influence the realization of the development potential?

During the first stages of planning (1, 2, and 3) the credit specialist gathers the data on the agricultural credit situation as outlined above, both at national and regional level. In sketching the regional development strategy, recommendations for improvement of the institutional credit market, in particular, should be incorporated in this strategy (Stages 3 and 5).

Professional expertise required

The agricultural economist, preferably with experience in this field, usually carries out an agricultural credit survey. Unfortunately his other duties within the team often make it impossible to pay more than scanty attention to the subject, with the result that data on the amount of credit and the number of recipients remain incomplete and that inadequacy of the credit facilities is stated without reaching firm conclusions on an overall development strategy for the credit frame-work needed.

A better solution is to invite a credit consultant, usually someone with

long-standing experience in the world of banking, to do the job. Unburdened with other terms of reference, that specialist is in a much better position to do a thorough job than the agricultural economist.

Terms of reference in rural institutions research have to be clearly defined, at the latest at the end of Stage 2. Separate consultants are preferable to the jack-of-all-trades who will soon find himself entangled in a multitude of problems that he is unable to handle alone. The type of expertise called for differs with each specific situation. Sometimes delegation is possible within the team; at other times assistance from outside consultants is clearly needed.

Usual working methods and sources of information

Agricultural credit has a demand and a supply dimension. To be eligible for credit, the potential borrower must have repayment capacity, which is mainly a function of the development potential of his farm and the management capacity of the farming household. All too easily, agricultural credit is seen as a panacea for solving small farmers' problems, provoking such stereotypes as 'there exists a huge, unsatisfied demand for agricultural credit'. Credit must be repaid and this requires repayment capacity. Only a general survey of farming conditions, potentials, and constraints can substantiate the claim of an unsatisfied regional credit demand. Such a survey has to be carried out in conjunction with other teammembers.

Credit is supplied by two sources: the formal or institutional credit market and the unorganized or informal credit market. Both need to be evaluated for effectiveness and efficiency, and this requires a separate survey of the existing credit sources. This survey is conducted by the credit specialist of the planning team.

Finally, a confrontation of demand and supply is necessary to arrive at a judgement of the significance of agricultural credit in the context of a development strategy. This requires in-depth interviews with the exponents of both supply and demand. Differences in development perception of both parties and the role of credit in that perception may interfere with the proper functioning of the institutional credit system. Both perceptions have to be brought in line and this may be seen as the ultimate rationale of the regional planning exercise.

Specific constraints

One of the most common problems in gathering credit data is the difficulty of surveying the non-institutional or informal market. Data on informal credit sources are practically non-existent and hard to come by; records, even when properly kept, are seldom open to inspection. Interest rates are camouflaged by the mechanics of trading, while repayment may be in the form of cash, produce, or labour. Timeliness, flexibility, local knowledge, and non-bureaucratic procedures give informal credit an advantage over the institutional sector, particularly in dealing with small-scale farmers. The formal and informal credit markets are complementary. Farmers can and do borrow from both sources. Lack of data on the extent of informal borrowing adds an extra risk to the institutional supply of credits. Another problem confronting the credit specialist is lack of information on the saving potential of the farming population.

2. Checklist for AGRICULTURAL CREDIT

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data – use of data
T1 DATA SOURCES	1	
1.1 International: libraries, FAO, ILO, World Bank	1	
1.2 National: libraries, national plan, government	1	
1.3 Regional: annual reports, interviews with credit suppliers and users	2	
T2 SOCIO-ECONOMIC CONTEXT	1	– to determine credit needs & objectives, costs, and success of credit programs
2.1 Land tenure systems	2/3	→ U
2.2 Market and price policy, regulation and control	2/3	→ W
2.3 Development and technological potential	3	
Land use (crops and livestock)	3	→ D, – present/potential
Crop inputs	3	→ F, – present/potential

Data to be obtained or provided	Stage	Remarks
Animal production inputs	3	→ G, - present/potential
Uncertainly and risks related to output	3	→ W
2.4 Extension services	3	→ P
2.5 Infrastructure	2/3	
Organization of farm input supply	2/3	→ S, X; - need for timely delivery of inputs
Storage of products	2/3	→ S, X; - seasonal price fluctuations of products
Transport to market	2/3	→ Y
T3 CREDIT DEMAND	3	
3.1 Extent and nature of credit demand: sectors of influence	3	- production/consumption wise
3.2 Debt-carrying capacity of farm households	3	- farm and non-farm income
3.3 Saving potential of farm households	3	
3.4 Accessibility to credit markets (institutional and non-institutional)	3	
3.5 Borrowers' perception of role and functioning of credit markets	3/5	- compare with suppliers' perception
T4 CREDIT SUPPLY		
(ideally, evaluation of both the institutional and non-institutional markets)		- evaluation mostly limited to institutional credit
4.1 Sources and continuity of funds, terms and conditions	3	
4.2 Policies to mobilize savings	3	
4.3 Utilization of loan-making potential	3	
Length of loan season		
Financing non-agriculture		
Provision of complementary services (inputs in kind, marketing of output)		

Data to be obtained or provided	Stage	Remarks
4.4 Credit policy		
Objectives: production or welfare oriented	2	
Type and amount of loans per crop, per region, and per farm-size groups	2/3	
Terms and conditions of loans	2/3	
Consistency with development strategy	3	
4.5 Loan policy	2/3	
Loan application procedures	3	
Appraisal of credit needs (production, consumption)	3	
Decision-making process	3	
Loan basis criteria	2/3	
collateral		
personal security (moral standard, farming ability), guarantors		
repayment capacity		
insurance		
Credit limits of individual loans	2/3	
Use of norms for investment items	2/3	
Loan disbursement (methods, timeliness)	3	
Loan repayment	2/3	
procedures and timing		
supervision and control		
coordination between credit sources		
sanctions		

Data to be obtained or provided	Stage	Remarks
Management	3	
administrations, inspection, audit, supervision		
statistics		
costs of loan servicing		
efficiency (number and amount of loans per personnel)		
degree of self-financing/ subsidy element		
T5 LOAN EFFECTS	3/5	
5.1 Effects on farm productivity and income	3/5	
5.2 Analysis of debt portfolio as a clue to loan defaulting (per regio, farm size, and type of loan)	3/5	
5.3 Analysis of factors influencing loan effects	3/5	
Delivery of credit and farm inputs (timeliness)		
Adequacy of extension service		
Adequacy of market outlet		
T6 FORMULATION OF ACTION PROGRAM	5/6	
6.1 Type of action(s) recommended		
6.2 Organizational requirements		
6.3 Legislative provisions, if any		
6.4 Adjustments credit supply	5/6	
Type of agencies, their number and geographical distribution		
Personnel: their number and skill		
Physical facilities, their location		
Budgets and financial support		
Time schedule		

3. Numerical review of identified activities for AGRICULTURAL CREDIT (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	217	21,22,28	(215)
2.2	31	225	29,30,33	
2.3	46		45	
2.4				
3.1	60	256,264	63,(76)	446
3.2	78,84	272	83,(86)(90)(91)(95)	268
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	323,331,337	131,136,137	329,330
5.2		347	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

U. LAND TENURE

J.W. Kroon and D.B.W.M. van Dusseldorp *

1. Task and interdisciplinary function

Main features of the task

The task of the land tenure discipline is to make a dynamic analysis of the land (and water) tenure situation. First of all an identification has to be made of the present tenurial situation. Specific attention has to be paid to tenurial situations where land (water) is held under customary law. In countries where indigenous societies exist with a traditional concept of land tenure often two different law systems (according to western concept respectively traditional concept) are in operation. In many cases there is a question of conflict of law.

In these traditional societies there is a trend whereby 'communal rights' to land (water) are being replaced by more industrial rights.

Due to increasing population pressure excessive subdivision and fragmentation of holdings occurs; the relation with the existing law systems should be indicated.

The distribution of land tenure rights and those on water, rights on trees, hunting rights, fishing rights, etc., and their trends have to be analysed as well as the various tenancy arrangements. The role of government in the institutional planning of land proprietor structure (legislation, coöps, etc.) and the physical planning of land use also belong to the field of investigation of the land tenure discipline.

From the dynamic analysis of the present land tenure situation, the potentials and constraints for future technical, economic, and social developments can be derived. It should then be possible to elaborate proposals on

* *The authors acknowledge contributions by G.E. Frerks*

the desired future tenurial status that will promote and enable the planned development. Suggestions for legislative action should be made.
The recommendations and related programs of action compiled by the land tenure discipline are indicatory only. Detailed proposals for changes in land tenure laws or other legal measures are matters for the national or local authorities. Because of the juridical expertise available in the land tenure discipline, it will most likely be asked to advise also on the juridical aspects of the work of other disciplines.

Interdisciplinary function

The tenurial system of land and water, especially in predominantly rural areas, is closely interwoven in the total fabric of the society. Land rent, cooperatives, agricultural credit - in short all socio-political and economic institutions that affect the occupancy and use of land (or water) - are influenced by or have their influence on the tenurial system(s). The land tenure discipline will therefore work in close cooperation with the sociologist, the agricultural economist, the specialists in cooperatives, agricultural credit, and public administration, and the physical planners. He will provide them with the relevant land tenure and juridical information and receive from them the information that explains past developments in the tenurial system and expected developments within the context of the society. Only in this way can recommendations be made that, besides being juridically consistant, are also socially acceptable and administratively implementable.

Professional expertise required

Land tenure always plays a role in regional planning for predominantly rural areas. Whether a land tenure specialist is appointed in a planning team depends on the extent of the land tenure problems expected in the future development of a region and in how far the principals bring the land tenure question under the terms of reference of the team.
If a land tenure specialist is required, he must be well versed in agricultural law and in the customary law of indigenous people. He must also combine a certain theoretical level of knowledge with practical experience in planning and implementing laws and juridical measures.
If there is no provision for a land tenure specialist, it is desirable that at least one of the other team members has a sufficient command of land te-

nure to be able to indicate the major tenurial issues to be expected in the proposed development. Such knowledge may be found among the disciplines of sociology, agricultural economics, cooperatives, agricultural credit, or public administration. Whoever it is that deals with land tenure, he should have a certain political sensitivity because proposals on law tenure nearly always have socio-political connotations.

Usual working methods and sources of information

The land tenure specialist starts with an analysis of the government objectives in the field of land tenure, the existing government legislation on land tenure, and the laws, including customary laws, which pertain to the subjects. This information is to be found in libraries or at the government (printing) offices at the national level.

In cooperation with the disciplines indicated earlier, he has to place the existing juridical framework of land and water within the societal context of the region. Besides the analysis of government documents and the elaboration of information from other disciplines, the land tenure specialist has to find out through enquiries in the field how the land tenure laws are interpreted, implemented, and accepted by the owners and users of land and water. Special attention must be paid to the collection of information on native customary law and tenancy systems.

This will require field surveys for which in most cases the time will not have been foreseen; they therefore should be brought forward early as proposals for research programs in the regional plan.

Specific constraints

Because of the political aspects often related to land tenure, the relevant expert faces problems in the collection of accurate data from the field, and he must be very careful in his formulation of the present and proposed future land tenure systems. When two land tenure systems exist (according to western concept resp. traditional concept) side by side, it will be a difficult and precarious task for the land tenure expert to describe the situation and the consequences it will have for the implementation of the regional plan.

2. Checklist for LAND TENURE

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
U1 DATA SOURCES ON LAND AND WATER LEGISLATION	1	
1.1 International: libraries, FAO, Land Tenure Centre, Wisconsin, USA, etc.	1	
1.2 National: libraries, dept. of agriculture, legislation and land administration, bureau of statistics, national plan, government printing office	1	
1.3 Regional: court land records, registration offices, offices for land tax administration, interviews	2	
U2 GOVERNMENT OBJECTIVES	1	
2.1 Land-ownership	1/2	
State land	2	
Private land	2	
Communual land: held under traditional law	2	
2.2 Land tenure & tenancy arrangements	1/2	
2.3 Customary rights	1/2	
2.4 Landlordism	1/2	
2.5 Land reform and land consolidation	1/2	
2.6 Land adjudication and registration	1/2	
2.7 Land reservations for for forestry, protective purposes, etc.	1/2	
U3 DISTRIBUTION OF LAND	1	- hist. review and present
3.1 According to size (incl. historical analysis)	2	
3.2 According to land-ownership and land occupancy under customary law	2	

Data to be obtained or provided	Stage	Remarks
3.3 Land and water use	2	- hist. review, present & potential cf. D
3.4 Shifts in the past to a different land tenure system	2	
3.5 Agricultural investment level	2	→ W
U4 LAND AND WATER OWNERSHIP	2	- present & hist. review
4.1 Forms and titles	2	
4.2 Transferability: heritage, sales, mortgage	3	
4.3 Prices of land and water	3	
4.4 Consequences for agricultural development	3	
U5 LAND TENURE AND TENANCY ARRANGEMENTS	2	- present & hist. review
5.1 Forms: private, familial, association, cooperative, communal; their registration	2	
5.2 Arrangements	2	
Types of contract: legalization, written, oral	3	
Conditions of contract: time, price, benefit/cost sharing	3	
Method of payment	3	
Share-cropping arrangements	3	
5.3 Consequences for agricultural development	3	
U6 CUSTOMARY RIGHTS IN LAND AND WATER	2	
6.1 Consequences for agricultural development	3	
U7 LAND DISPUTES (extent, type, impact)	2	
U8 GOVERNMENT ORGANIZATIONS AND ACTIONS CONCERNING LAND AND WATER	1	- hist. & present review; potential future actions
8.1 Registration	2	
8.2 Land and water taxation	2	

Data to be obtained or provided	Stage	Remarks
8.3 Land reform	2	
8.4 Consolidation	2	
8.5 Impact on development	3/5	

3. Numerical review of identified activities for LAND TENURE (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	218	21,22,28	(215)
2.2	31	226	29,30,33	
2.3	46		35,38,41,45	
2.4				
3.1	60	257,265	63,(76)	268,446
3.2	84,87	267,273,278	83,(86)(90) (91)(92)	
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132	324,338	131,136,137	323,329
5.2		348	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

Numerical review of identified activities for MACRO ECONOMY[1] (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in[2]:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11.13		10,12,14	
2.1	25,26	412	21,22,28	(215)
2.2	31	415	29,30,33	
2.3	42,43,44,45, 46	417	(40),41	
2.4				
3.1	60	440,441,443, 444,449	74,80,(76)	931
3.2	83,96	453,454,456, 460,462,463	80,83,(86)(90) (91)(92),93,94, 95	(279)(281)(450), 457,458,459
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	131,132,134, 137,138	511,512,515, 517,518	131,136	323,328,329,330, 513,514,516
5.2		521	140,141	
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

[1] *For the (1) Task and Interdisciplinary function and (2) the Checklist, reference is made to W: Agro Economy and X: Economics non-agricultural production sectors*

[2] numbers between brackets are to be regarded as optional

W. AGRICULTURAL ECONOMY

F.J. Polman

1. Task and interdisciplinary function

Main features of the task

It will be the responsibility of the economic discipline, and of the agricultural economist in particular, to perform the following tasks:

a. Placing the relevant regions in their proper position, in relation to other regions and in relation to the national economy, regarding agricultural production, employment, income, and income distribution, both existing and potential. This placing can only be done as a result of an analysis of the long-term role which agriculture will have in the national economy in relation to the following factors:

   contribution to the national income;
   sectoral and regional income distribution;
   food supply;
   inputs necessary for the processing industry;
   national savings;
   employment.

   These factors of the agricultural sector will have to be worded in a regionalized Perspective Plan of National Development, in which are quantified the key factors determining the economic developments; such as growth of the value added, the corresponding investments for this growth, the savings quota, foreign aid component, the production structure, and the income distribution under various alternative assumptions.

b. Delimiting the objectives of the government concerning the national agricultural development and identifying the instruments used to this end:

price, subsidy, and tax policies;
investment policy;
import and export policy on agricultural products;
self sufficiency policy;
land and land tenure policy.

Where relevant, the national and sectoral policies should be specified according to the region.

The above mentioned governmental policy instruments which regulate agricultural development are determined both in character and extent by the position of the agricultural sector in the national economy as delineated under (a). Of importance for the relative position at regional level are the following factors in particular:

price development of agricultural products;
regional investment policy;
migration policy;
land and land tenure policy;
the functioning of the government organizations serving rural areas.

c. Formulation of a regional agro-economic policy for/by the governmental administration, which must result in measures that have a calculable effect on the socio-economic development. The policies and measures are expressed in terms such as the following:

Identification of investment projects for reclamation or improved exploitation of natural resources;

Governmental intervention directed towards changing inadequate socio-economic structures within the agricultural sector;

Intervention directed towards an improved control of the desired regional agricultural development, through government agencies.

Interdisciplinary function

The position of the agricultural economist in relation to the other disciplines involved in regional planning can be summarized as below:
Agricultural and technical disciplines are oriented towards the investigation of possibilities to use the natural resources for agricultural production. The agricultural economist has to evaluate the socio-economic benefits which would result from this production, as well as the corresponding socio-economic investments and costs.

Also, he would determine what and how much the society is (or would have to be) prepared to pay for the use, or more efficient use, of these natural resources; given the goals of sectoral and regional developments.
The social disciplines are oriented towards the investigation of the possibilities of introducing into the rural community technological innovations and more efficient forms of agricultural production, as well as the changes necessary in the social structure and the rural institutions to this end.
The agricultural economist analyzes the economic and financial effects of these improvements on the household income of the farmer, and determines the desired farm types which would guarantee the optimal socio-economic use of these improvements.

Professional expertise required

In its most extensive form the following personnel would be required for the economic and agro-economic investigations outlined above:

a macro-economist;
an agricultural economist;
a farm economist;
an econometrist;
inquirers trained in farm economy;
assistants for aiding in the execution of inquiries and for calculations.

The extent of the team will be defined by the specific work situation. It may often be possible that the tasks of the macro-economist, the agricultural economist, and the farm economist can be appointed to one expert.
In the case that a complex choice problem arises for which a mathematic model is necessary, an econometrist must also be available.
The number of inquirers and other administrative assistants is determined by the amount and type of information available, the size of the region concerned, the existing infrastructure, etc.

Usual working methods, and sources of information

The analytic framework of the economic disciplines can be schematically described as in Figure 11.

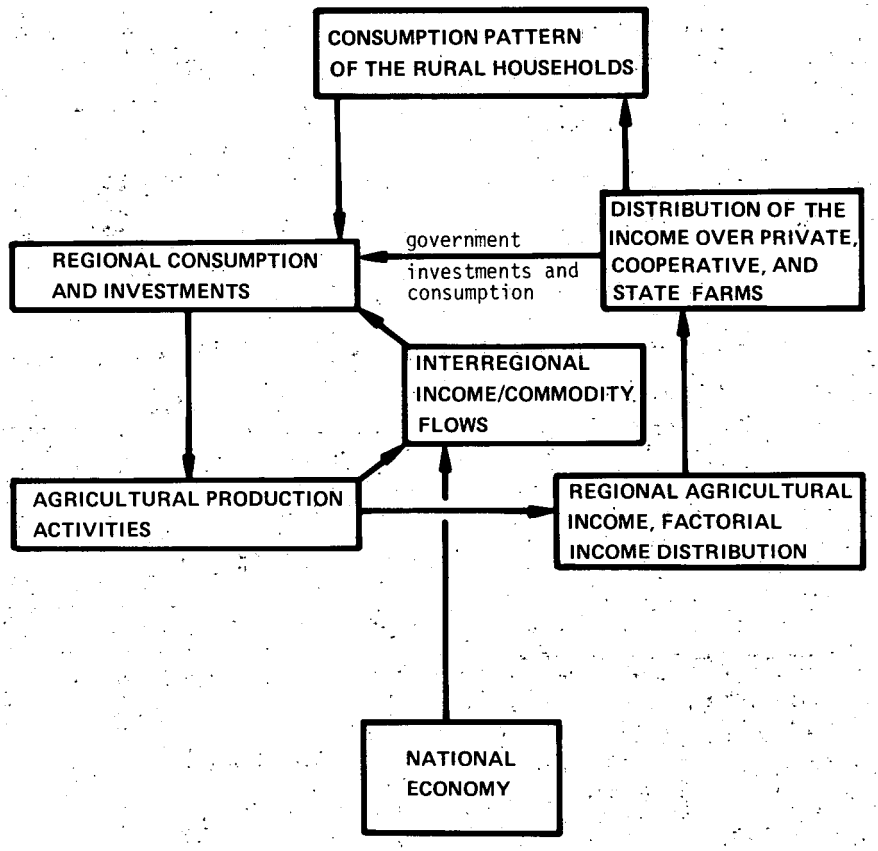

Fig.11 Schematic representation of the economic framework

The scheme gives a simple representation of a regional agricultural economy, and its relationships to the other regions as well as to the national economy.

The agricultural economist should analyze all the elements presented in the scheme, as well as their mutual relationships. This analysis thus includes determination of the following items:

- the desired level of well-being of the rural household;
- the regional consumption derived from the desired level of well-being;
- an agricultural production pattern based, among others, on the regional comsumption;
- the part of the regional agricultural production that is exported from the region;
- the regional agricultural income and its distribution over the production factors labour, land, and capital;

the distribution of the income over investments, government consumption, and consumption by the household;

volume of commodities and income transfers from other regions, and from the national economy.

Upon completion of such an analysis of the regional agricultural situation, a development strategy should be formulated, including the method necessary for the realization of this strategy, given the available governmental resources.

Governmental instruments for the development of a regional agricultural economy are indicated schematically in Figure 12.

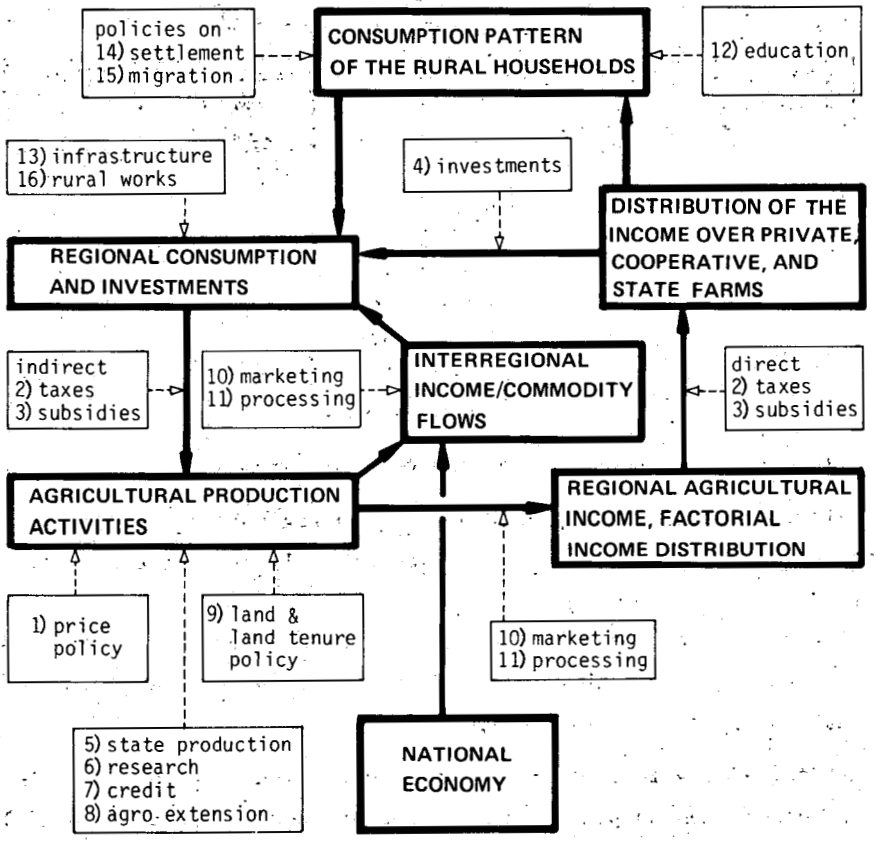

Fig. 12 Schematic representation of Governmental instruments for development of the regional agricultural economy.

In cooperation with other disciplines, the agricultural economist will identify and formulate the possible government interventions (1-16) in

programs of action, regulations, and development projects; all this to the level of identification.

Specific constraints

The specific constraint for the agricultural economist is the availability of national and regional economic-statistical material. At the regional level, the necessary basic economic information can be collected by the planning team in a limited time period. However, lack of adequate macro-economic information may cause problematic choice possibilities. If, for example, a reasonably reliable system of national accounting is lacking, it would be impossible to establish such a system in a short term.

In general, it should be stated that a minimum amount of economic data must already exist within the government administration before any useful work can be done by the (agricultural) economist.

2. Checklist for AGRO -ECONOMY

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
W1 PRESENT SITUATION		
1.1 Position in the national economy	1/2	= basic statistics from nat. accounts and socio-econ. dev. plans
Sectoral composition of the domestic product	1/2	
Regional composition of the domestic product per sector	1/2	
Income distribution within the agricultural sector	2	
Income distribution within the non-agricultural sectors		→ X
Regional specification of these income distributions	2	
Employment within the agricultural sector. Employment within the non-agricultural sector	2	→ X
Share of agriculture in imports and exports	1/2	

Data to be obtained or provided	Stage	Remarks
1.2 Subsectors within the agricultural sector		= basic statistics from nat. accounts and agric. plans
Subsectoral composition of agricultural outputs and incomes	1/2	
Regional composition of agricultural outputs per subsector	1/2	
Demand for agricultural products	2	
Self-sufficiency ratio per product	2	
Foreign exchange earnings per product	2	
Linkages to the non-agricultural sectors	2/3	- input/output table
W2 AGRICULTURAL ENTERPRISES: PRESENT SITUATION AND REGIONAL ANALYSIS		
2.1 Farm-size distribution, degree of fragmentation	2/3	
2.2 Production structure of the farms and farm types	2/3	
2.3 Cultural techniques, labour films, degree of mechanization, degree of commercialization	2/3	
2.4 Input-output analysis of crops	2/3	
2.5 Farm incomes	2/3	
2.6 Additional incomes of farmers	2/3	
W3 AGRICULTURAL ECONOMIC POLICY		
3.1 Prices of agricultural products and inputs	2/3	
3.2 Price analysis, taxes and subsidies on agricultural products	2/3	
3.3 Price analysis of construction materials, labour and machinery	2/3	- cf. Y
3.4 Shadow prices of products & inputs	2/3	
3.5 Basic support prices, maximum prices, delivery obligations	2/3	

Data to be obtained or provided	Stage	Remarks
3.6 Investments in agriculture specified per subsector and per region	2	
3.7 Capital output ratios of investments	2	
3.8 Regional and subsectoral investment, credit, and fiscal policy	2	
3.9 Linkages of agricultural investments with non-agricultural sectors	2	- input/output table, cf. X
3.10 Import-export policy, sector protection, trade position	2	- customs tariffs
3.11 Support of the agricultural sector by the following institutions:	2	= in coop. with → P, R, S, T
credit		
extension		
marketing		
cooperatives		
research		
public administration & services		
W4 SECTOR: POTENTIAL SITUATION		
4.1 Development of the production structure	3	
4.2 Place of the agricultural sector in the development process	3	
Contribution of the agricultural sector to the national income	3	
Income distribution within the non-agricultural sector		- cf. X
Employment within the agricultural sector. Employment within the non-agricultural sectors	3	- cf. X
4.3 Development possibilities of the agricultural subsectors	3	- in coop. with disciplines for phys. resources and production A to J
Identification of projects and programs for the exploitation of unutilized or under-utilized soil, water, and human resources	2/3	→ D, C

Data to be obtained or provided	Stage	Remarks
Input-output analysis of potential crops in the improved situation	3	- cf. F
Expected costs and yields with and without projects & programs	3	
Localization of areas/industries where improvements in the crop choice package and production techniques are to be expected; expected costs and benefits	3	→ L
Potential agricultural products	3	→ F, G, J
Development of the demand for agricultural products within the country and abroad	3/5	
Self-sufficiency ratio per product	3/5	
Foreign exchange earnings per product	3/5	
Relationship to non-agricultural sectors	3/5	- cf. X
W5 THE REGION IN THE AGRICULTURAL DEVELOPMENT PROCESS	3/5	
5.1 Possible development of the regional agricultural income	3/5	
5.2 Income targets of the rural household	3/5	
5.3 Carrying capacity of agriculture in the region	3	
5.4 Weight to be attributed to income growth, income distribution, investments, and consumption for the region	3/5	
5.5 Regional specification of the sub-sectoral development possibilities	3/5	
W6 AGRICULTURAL ENTERPRISES: POTENTIAL SITUATION AND REGIONAL ANALYSIS	3/5	
6.1 Desired production structure and farm types	3/5	- cf. F and G

Data to be obtained or provided	Stage	Remarks
6.2 Desired farm size distribution, given income/income-distribution objectives	3/5	
6.3 Cultural techniques, labour films, degree of mechanization and commercialization	3/5	
6.4 Input-output analysis of crops and animals	3/5	- cf. F and G
6.5 Farm income	3/5	
W7 AGRICULTURAL DEVELOPMENT POLICY		- in coop. with other economists (V, X) and the soc. and institut. disc. N to U
7.1 Ranking priorities for development options	3/5	
7.2 Attainable production targets	5	
7.3 Attainable rate of growth	3/5	
7.4 Requirements for rural institutions	5	
7.5 Budget consequences	5	
7.6 Program and time schedule	5	
short term		
middle term		
long term		

3. Numerical review of identified activities for AGRICULTURAL ECONOMY (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	413	21,22,28	(215)
2.2	31	415	29,30,33	
2.3	34,36,39,46		37,(40),41,42, 43,44,45	
2.4				
3.1	60,61,62,63, 66,72,73,76, 105	442,446,448	65,67,68,71,74	255,256,449, 651,652
3.2	85,89,92,96	455,461	77,78,79,81,82, 83,84,(86)(90), 91	(271)(272)(450) 453,454,456,460
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132,134,136, 138	513,515,519	131,135,137	512,518
5.2			140,141	343,521
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

X. ECONOMY OF NON-AGRICULTURAL PRODUCTION SECTORS

R. Wirtz, H.I. Pouw and P.T. Engelkamp

1. Task and interdisciplinary function

The non-agricultural production sectors, which are often called the secondary and tertiary sectors comprise the following:

	ISIC * code nr.	Description
Secondary	2	Mining and Quarrying
	3	Manufacturing
	4	Public Utilities
	5	Building and Construction
Tertiary	6	Trade
	7	Transport, Storage and Communication
	8	Financing, Insurance, Real Estate and Business Services
	9	Community, Social and Personal Services.

In a rural area the importance of these sectors will be limited. However, as soon as industrialization gains momentum the importance of the secondary and tertiary sectors will increase rapidly.

Main features of the tasks

The fundamental tasks of the non-agricultural economist are:

to conduct economic surveys of the non-agricultural sectors in particular and

to make concrete recommendations for a development program.

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* *ISIC = International Standard for Industrial Classification*

The purposes of such surveys are:

To provide background information for the formulation of a government policy relating to fore-mentioned economic activities, for example to assess the scope for expansion in existing and creation of new kinds of industries, and

To provide factual information and forecasts that will be helpful to be industrialists themselves.

These sectoral economic surveys include studies about:

The present relative position and the historical development pattern of these sectors within the regional and national economy in terms of their contribution to gross regional product and gross domestic product; employment and job creation, both quantitatively and qualitatively; gross capital formation; balance of payments; income distribution,; labour productivity; and capital productivity.

The nature of the market of the product, raw materials and primary inputs in terms of quantity; quality; market radius - local, regional, national or international; price; and elasticity of demand respectively supply.

The general structure of intermediate and primary input requirements and sales, inter-industrial backward and forward linkages of selected non-agricultural sectors.

The regional distribution of demand for and inter-regional trade in both the products and the major inputs pertaining to a given non-agricultural sector in order to determine the local requirements of the industry e.g. resource-based, market-oriented, labour-oriented or foot-loose.

The relative importance of different cost elements (for example, labour costs, material costs and capital costs) in relation to output in enterprises of different sizes.

Obviously an industrial economist working at the regional level will not be in the position to study separately the general characteristics and the local requirements of all non agricultural industries. Therefore, it is desirable to centralize the above mentioned research activities at the national level so that the results can be made available to the planning team in all areas.

In such case, the regional industrial economist can select those types of industries which are compatible with the existing industrial structure, human-, social-, and natural resources of the region.

Further, the regional industrial economist must investigate and assess:

The effects of the present central and local governments' monetary and fiscal policies on the industrialization climate in the country in

general and the specific impact of the present financial and non-financial policy instruments on the industrial climate in the particular region.

The national and regional institutional framework to promote regional industrial development.

The characteristics and needs of the local enterprises with regard to problems of finance; supply and quality of raw materials; marketing problems; production problems; labour problems; management and communication problems; and entrepreneurial skills.

In cooperation with the other disciplines, the regional economic picture can be completed with the assessment of the topography and degree of accessibility; human-, social and natural resources available in the region.

The next step will be forecast and identification of potentials and bottlenecks in each of the non-agricultural sectors mentioned. Together with the total planning team regional economic policies will be formulated. Goals will be specified and targets quantified. To achieve these targets, a set of instruments has to be selected, programs of action and implementation time schedules have to be formulated.

Finally these programs of action will be expressed in terms of

investment opportunities with a rough estimate of investment costs and benefits;

investments required to improve the physical, social and institutional infrastructure;

foreign exchange earned or saved;

jobs to be created and levels of skills required; and

income distribution.

Interdisciplinary function

In the planning process the agricultural sector will set the pace for development. This development will determine development in other sectors by means of increased purchasing power, larger volumes of agricultural produce as inputs for processing industries, transport and trade sectors. Moreover, accelerated development in agriculture will increase demand for implements, machinery, agro-chemicals, financial and technical services.

Increased purchasing power will cause initially a higher demand for consumption goods and later for capital goods as well, respectively locally manufactured and imported. On the basis of anticipated growth, investment opportunity studies can be prepared independent of the agricultural sector. On

the one hand the technical disciplines will have to collect and provide specific data within their field of competence. On the other hand the sector economists will have to prescribe what data have to be collected by these disciplines and provide them with the necessary economic information.
In the agro-allied activities, both forward and backward, there will be a time-lag caused by the time required for formulating the proposals for agricultural development. Here the other sectors depend fully on data provided by the disciplines dealing with the primary sectors. In an iterative way alternatives have to be screened to avoid waste of effort and time. The coordinating function of the macro-economist will be essential in order to strike a balance between the various sectors. The macro-economist will collect and process the information provided by the branch- and sector specialists, as indicated in the (first) paragraph.

Professional expertise required

In the reconnaissance stage of the planning the following personnel will be required:

a macro/regional economist

an industrial economist, conversant in banking, trade and transport.

Initial findings will determine the need for additional personnel. For industrial surveys a micro economist/business administrator and research-assistants are needed. The further extent of the team will be defined by the specific work situation. Specialists like transport economists might be called in for short periods at a later stage.

Usual working methods and sources of information

Prior to the collection of detailed data, a preliminary analysis frame-work has to be worked out. This framework will be made up of several analysis methods.
For a better understanding of the regional complex in the preparatory stage all economic disciplines have to compile a basic regional statistical compendium. Regular team meetings of all economists will be required to provide for one consistent compendium. This compendium then will be the basis for further collection of data.
Assuming that next to agriculture the development of manufactering industries will be the determinant for the economic development of a region a detailed

analysis is required of the present situation. This analysis will be performed by using the following methods:

- industrial survey, most likely on a sample basis;
- economic base and trade-flow analysis;
- industrial composition analysis;
- inter-industry relations analysis;
- manpower studies;
- household budget-surveys on a sample basis.

The outcome of these studies will determine to what extent further investigations are required for the identification of investment opportunities.

Since the main emphasis will be on agricultural development a more detailed study will be required of the agri-business system in order to tune the various components within that system.
The diagram (Fig.13) shows the linkages between the various components of the agribusiness system.
Focussing on the processing industries (= agro-based industries) the agricultural produce has to be followed to and from this phase. The main variable will be the demand for the processed products in the domestic and foreign markets.
Information about those markets will have a major impact on the decisions taken at the processors' level.
Activities at this level will determine whether the farmer will find a ready market for his produce. Most often adaptation to final demand will not automatically take place at the farmer's level, but requires guidance. This guidance can be obtained from the fieldstaff of the processing industry as happens in most industrialized countries. However, in developing countries more often this guidance is channelled via the governmental agricultural extension service.
The agricultural economist will determine costs and benefits of existing and new enterprises within the agricultural sector. The industrial sector economist has to determine costs and benefits of economic activities using agricultural produce as an input and/or the agricultural sector as an outlet. Since the gearing of farm produce to final demand will benefit all links in the chain, close collaboration between the macro/agricultural

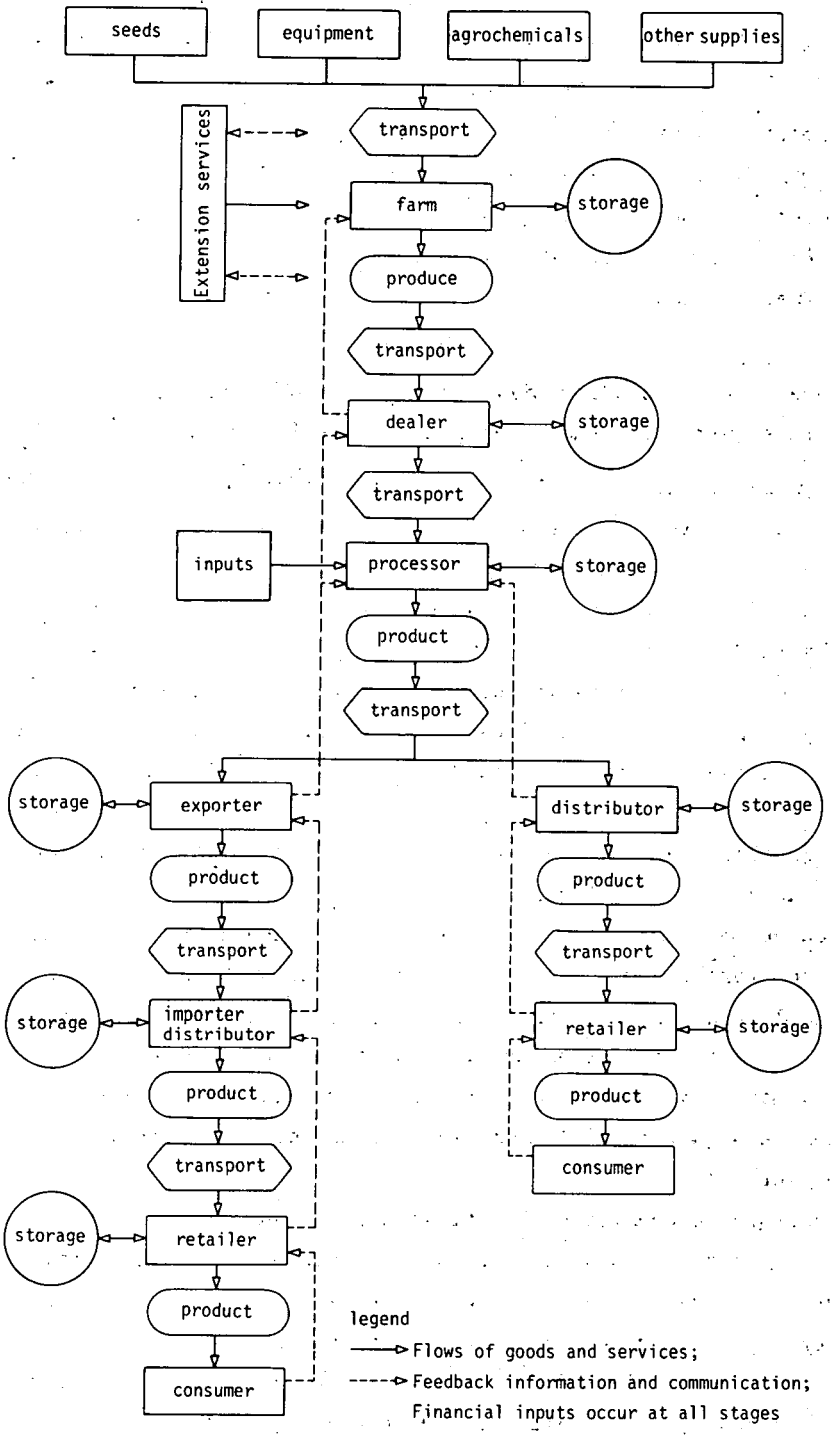

Fig. 13. Scheme of the linkages between the components of the agribusiness system.

economist and the other sector economist will be required.

Detailed studies have to be made of the three main components of any agro-industry project: procurement, processing and marketing. There are four key characteristics that an agro-industry procurement system should attain in order to provide a solid basis for the processing operation. It should be able to supply an *adequate quantity* of raw material of an *acceptable quality* at the *appropriate time* for a *reasonable cost*. Information as to this will come mainly from the disciplines of the agricultural sector. When one begins to analyze the industrialization component of the project there are several areas which deserve special attention. One has to deal with the selection of the processing technology to be employed and where to locate the plant.

Manpower policies and aspects of employment creation will determine to a large extent technology employed and the location.

Although marketing comes after the procurement and processing components, actually marketing is the starting point for an agro-industry project analysis. Unless adequate market demand exists the project has no economic base.

Therefore the marketing analysis must focus initially on identifying the consumers, examining their behaviour, and forecasting the demand.

After the direct impact of agro-based industries possibilities for agro-allied industries like farm implements, machinery and equipment, agro-chemicals have to be identified.

The outcome of enlarged output in agriculture and manufacturing industries will have consequences for the various sectors linked with these pushing sectors: transport in terms of road capacity, transport means and storage capacity; trade in terms of distribution channels; banking in terms of availability of outlets; public utilities in terms of planned capacity and anticipated demand.

Aggregation of all findings will determine the total amount of investment required, manpower requirements and institutional infrastructure needed for the implementation of the various proposals.

Apart from studies mentioned, sources of information will be external trade statistics, national and regional accounts and input/output tables.

Specific constraints

For the above mentioned studies rather detailed data will be required. These data will have to be disaggregated to a regional level. Time and funds are usually the major constraints to carry out detailed studies in case specific data are not available.

Data for the secondary and tertiary sectors are usually less detailed than data for the agricultural sector. These facts have to be reconciled with each other in order to make a comprehensive and consistent plan. The coordination functions of the macro-economist have to warrant such procedure. Good contacts with statistical offices are a prerequisite to be able to use prime data that have been collected for other purposes.

2. Checklist for ECONOMY NON-AGRICULTURAL PRODUCTION SECTORS

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
X1 OVERALL ECONOMIC PRESENT SITUATION		
General and overall economic data	1/2	→ V
Economic system and policies	1/2	→ V
1.2 Population and social characteristics		
Population size	1/2	→ M
Income and wealth	1/2	- in cooperation with V and W
Age distribution	2	→ M
Subsets:		
Farmers	2	→ P, W
Minorities	2	→ N
Rural/urban population	2	→ N
Education	2/3	→ O
Work experience	2/3	
Skills/craftsmanship	2/3	- in cooperation with O
Personal income and expenditure patterns	2/3	- in cooperation with V, W
Employment and unemployment	2/3	- in cooperation with V, W

Data to be obtained or provided	Stage	Remarks
Labour force participation	2/3	- in cooperation with V, W
Worker total population ratio	2/3	- in cooperation with V, W
Female participation	2/3	- in cooperation with V, W
Health	2/3	→ Q
Living conditions	2/3	→ N, Q, Y
Welfare	2/3	→ N, V
Consumer behaviour	3/4	- in cooperation with V, W
1.3 Location characteristics		→ L
Physical resources	2/3	→ A/E, H, W
Other natural data		
Locational	2/3	
Geography/topography	2/3	→ B, D
Climatic features	2/3	→ A
Social capital	2/3	- in cooperation with R, V
Physical infrastructure		
Roads	2/3	→ Y
Railways	2/3	→ Y
Waterways	2/3	→ Y
Airports	2/3	→ Y
Industrial estates/sites	2/3	- in cooperation with L, Y
Power supplies	2/3	- in cooperation with L, Y
Water supply	2/3	- in cooperation with L, Y
Waste disposal system	2/3	- in cooperation with L, Y
Institutional infrastructure	2/3	→ R
Investments in infrastructure	2/3	- in coop. with R, V, Y
Rates and sources of infrastructure investments	2/3	- in coop. with R, V, Y
Governmental hierarchy	2/3	→ R
Inter- and intraregional orientations and spatial relationships	2/3	→ V, Y
Transportation/communication mixes and links		→ L

Data to be obtained or provided	Stage	Remarks
1.4 Economic activities		
Gross regional product	2/3	→ V
Value added per sector	2/3	- in cooperation with V, W
Gross capital formation	2/3	- in cooperation with V
Size of enterprises	2/3	
Concentration ratios	2/3	- in cooperation with L
Productivity ratios	2/3	- in cooperation with L
Enterprise characteristics	2/3	- in cooperation with L
Enterprise ownership		- in cooperation with L
Investments and capital accumulation	2/3	- in cooperation with V
Managerial skills		- in cooperation with L
Detailed characteristics of major economic activities	3	
Capital/output ratios	3	
Industry-mix characteristics	3	
Agri-business system	3	- in cooperation with P, W
1.5 Population - location relationships		
Population		
extent	2/3	→ M
density	2/3	→ M
Location and extent of population centers	2/3	→ M, Y
Migration	2/3	→ M, N
Landownership patterns	2/3	→ U
Distribution of settlements by population size	3	→ M
Distribution of population by settlements and settlement size	3	→ M
Distribution of ethnical groups by settlements	3	→ M, N
Travel patterns	3	→ N
Commutation	3	→ N
1.6 Population activity relationships		
Employment by industry	2/3	

Data to be obtained or provided	Stage	Remarks
Income and wages by industry	2/3	
Unemployment by industry experience	2/3	
Labour/capital ratios	2/3	
Labour productivity ratios	2/3	
Powerstructure agribusiness system	3	- in cooperation with P, W
1.7 Location activity relationships		
Location of commerce and industries	2/3	- in cooperation with L
Intra- and interregional flows and linkages	3	- in cooperation with V
Trade areas	3	
Labour market areas	3	
Special relationships with other regions	3	- in cooperation with V, W
X2.1 POTENTIAL SITUATION; INVESTMENT OPPORTUNITIES		
National priorities from National Development plan	2/3	- in cooperation with V
Imports	2/3	- in cooperation with V
Local materials availability	2/3	- in coop. with H, J, K, L, W
Available skills	3	- in cooperation with L
Industry studies		
expansion	3/4	- in cooperation with L
diversification	3/4	- in cooperation with L
Review of earlier project studies	3/4	- in cooperation with L
Adaptation of experience elsewhere	3/4	- in cooperation with L
Screening of industry lists	3/4	- in cooperation with L
Application of new technologies	3/4	→ L
2.2 Sector analysis		
Resources availability, present and future	3/4	- in cooperation with L, W

Data to be obtained or provided	Stage	Remarks
Past and present utilization of resources	3	- in cooperation with L
Past demand, past supply, past coverage of demand	3	
Market situation of specific product(s)	3	
Approximation future market situation of specific product(s)	3/4	
2.3 Project analysis		
Engineering		
Approx. capacity	3	- in cooperation with L
Expected capacity	3/4	- in cooperation with L
Existing processes	3	→ L
Approx. production	3	- in cooperation with L
Approx. production program	3/4	- in cooperation with L
Construction time	3	- in cooperation with L
Proposed production	3/4	- in cooperation with L
Site selection	3/4	- in cooperation with L, Y
2.4 Project sponsors		
Potential enterprises	3	
Proposed enterprises	3	
Legal status	3	
2.5 Investment costs/financing		
Estimated costs	3	
Unit cost of manufacturing	3	
Subdivided cost estimates	3/4	
Sources of finance	3	- in cooperation with V
Proposed financing	3/4	- in cooperation with V
2.6 Financial and economic analysis		
Amortization	3	- in cooperation with L
Interest rates	3	- in cooperation with V
Job creation	3	
Diversification	3	
Improvement of the foreign exchange situation	3	- in cooperation with V

Data to be obtained or provided	Stage	Remarks
Overall economic benefits/costs	3	- in cooperation with V
Average rate of return	3/4	
Specific costs	3/4	
Improvement of the balance of payment	3	- in cooperation with V
Social cost/benefit analysis	3/4	- in cooperation with V

3. Numerical review of identified activities for ECONOMY NON-AGRICULTURAL PRODUCTION SECTORS (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	411	21,22,28	(215)
2.2	31	414	29,30,33	623,624
2.3	40,46		42,43,44,45	
2.4				
3.1		445	70,74,(76)	449,656,657,658 664
3.2	93,94,95	450,451,452, 457,458,459	78,83,(86)(90) (91)	453,454
3.3	97,99			
3.4			102	
4.	111,113		112,114	
5.1	132,134,138	511,514,516, 520,724	131,137	723
5.2			140,141	521,736
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

Y. PHYSICAL INFRASTRUCTURE (incl. CIVIL ENGINEERING)

D.B.W.M. van Dusseldorp and J.M. van Staveren

1. Task and interdisciplinary function

Main features of the task

In regional plans great emphasis is given to the spatial location of development. Many proposals made by a regional planning team will have spatial consequences. The main task of the physical infrastructure expert will be to coordinate these proposals in a consistent physical infrastructure for the future.

His first task will be to make a dynamic analysis of the present settlement pattern. He must locate the socio-economic service units and service centres (hamlets, villages, towns, and cities), the industrial plans and public utilities (electricity, water supply, sewage systems), the telephone and transport systems (road and railway networks, air fields and harbours). He must collect information on the construction costs of houses, offices, roads,etc.

His next task is to design a hierarchy of centres on the basis of information from other disciplines and from national guidelines, and to project the centres in the region. He must indicate the interrelations between the centres by the transport systems of roads, railways, canals, and airfields, as well as by a communication system (telephone, etc.). He must also indicate the future pattern of public utilities (water, electricity, sewage). The various proposed developments are to be brought together in a set of interrelated maps. He must then draw up programs of action necessary to arrive at the proposed future physical infrastructure, including the cost estimates of these programs.

Interdisciplinary function

Like the economist and the sociologist, the physical infrastructure expert

has a major integrative function. From the disciplines of health, education, sociology, and all others that are projecting physical facilities in their programs of action, he must obtain information on threshold values, radius of action, etc. Conversely, he must discuss his tentative plans for the physical infrastructure with them.

Professional expertise required

To perform the tasks of the discipline, two types of expert are needed:

- A civil engineer with broad experience in the planning and costing of the construction of houses, roads, public utilities, etc.
- A town and country planner with experience in designing the hierarchy of service centres in rural areas (the design proper of the centres is normally not included in the regional plan).

Depending on the specific circumstances of the region, other specialists may be needed to advise on or to design important components of the infrastructure such as storage dams, flood control works, power houses, industrial complexes, public utilities, harbours, etc.

Usual working methods and sources of information

The civil engineer will use those techniques universally accepted and applied. He will need topographical maps of an appropriate scale (at least 1:100 000 and, for built up areas, 1:1 000 or 1:2 000). From the Department of Public Works or similar bodies, he must collect information on previous topographical or other surveys, on existing or planned engineering works, and on prices of local building materials and current methods of construction.

The town and country planner uses techniques derived from social geography. Important sources of information for him are aerial photographs and topographical maps. He will obtain information on the location and classification of physical facilities either directly from the relevant ministries or departments or indirectly via other disciplines of the team.

Specific constraints

As the town and country planner must rely on information from other disciplines, he often has to face problems when this information is not forthcoming at the proper time.

2. Checklist for PHYSICAL INFRASTRUCTURE

Data to be obtained or provided	Stage when data first req'd	Remarks → disc. mainly resp. = source of data - use of data
Y1 DATA SOURCES	1	
1.1 International: libraries		
1.2 National: national planning authority, cartographic centre, ministry of interior, chamber of commerce, religious institutions	1	
1.3 Regional: local leaders, own observations	2	
Y2 TOPOGRAPHIC MAPS	2	cf. D
Y3 POPULATION SIZE AND DISTRIBUTION	2	→ M, - present and future
Y4 TRANSPORT SYSTEMS	1	- present and required
(location, type, construction, capacity, ancillary works, and their condition)		
4.1 Roads	2	cf. C
4.2 Railroads	2	cf. C
4.3 Waterways	2	cf. C
4.4 Airfields	2	cf. C
4.5 Costs (investment, operation, maintenance)	2	
Y5 PUBLIC UTILITIES		
5.1 Electricity (requirements, use, production)	2	cf. L
5.2 Domestic and industrial water supply	2	cf. C and L
5.3 Sewage system	2	cf. C
5.4 Communication system (telephone, etc.)	2	
5.5 Costs (investment, operation, maintenance)	2	
Y6 HOUSING		
6.1 Types of housing	2	cf. N

Data to be obtained or provided	Stage	Remarks
6.2 Sanitation facilities	2/3	
6.3 Costs (construction, maintenance)	2/3	
Y7 SERVICE CENTRES: INVENTORY STANDARDS, CRITERIA, RADIUS OF ACTION, AREA OF COMPETENCE	2	- present and required, e.g. number of services per 1000 persons, radius of action, content of serv., etc.
7.1 Health services	2	→ Q
Hospitals: regional, district	2/3	
Health centres: primary, secondary	2/3	
Clinics (midwifery centres)	2/3	
7.2 Education and extension services	2	→ O, P
Universities	2/3	
Colleges, secondary and primary schools	2/3	
Kindergarten	2/3	
Teacher training centres	2/3	
Vocational schools	2/3	
Farmer training centres	2/3	in concert with F, G and W
7.3 Public administration services	2	→ R
Regional headquarters	2/3	
District headquarters	2/3	
Police stations	2/3	
7.4 Agricultural services	2	
District and village offices	2/3	→ R
Storage facilities	2/3	→ S, X
Warehouses	2/3	→ S, X
Experimental stations, trial plots	2/3	→ F, G, H, J
7.5 Banking		
Commercial banks	2/3	in concert with X
Agricultural banks: district villages offices	2/3	cf. T

Data to be obtained or provided	Stage	Remarks
7.6 Marketing		→ W
District and local markets	2/3	
Weekly markets	3/5	
7.7 Industries	2/3	→ L, X
7.8 Religious buildings (mosques, suran, temples, churches, chapels, etc.)	3/5	→ N
7.9 Trade: shops, etc.	3/5	→ L, X
Y8 SERVICE CENTRES: LOCATION, POLICY	1	- present and suggested
8.1 Location of services in centres or dispersed	2	
8.2 Hierarchy of centres	2	
8.3 Functions of centres per type	2	
8.4 Threshold of centres per type	2	
8.5 Relation with the road system	2	
8.6 Area of interest	2	
8.7 Area of competence	2	

3. Numerical review of identified activities for PHYSICAL INFRA STRUCTURE (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	11,13		10,12,14	
2.1	25,26	911	21,22,28	(215),811,814
2.2	31	912	29,30,33	820
2.3	46		43,45	
2.4				
3.1	60	931,932	74,75,(76)	260,261,262,263, 264,265,445,658, 664,841,842
3.2		933,934	83,(86)(90)(93) (94)(95),106	286,458,459,847, 851
3.3	97,99	935		
3.4			102	
4.	111,113		112,114	
5.1	132	961,962	131,137	329,330,516,729, 874,876,879
5.2	140	963	140,141	341,344,345,346, 347,735,736
5.3	152,153			
5.4			156	
6.1	183		182	
6.2			185,186	
6.3				

* numbers between brackets are to be regarded as optional

ANNEX IV. NUMERICAL REVIEWS OF ORGANIZATIONAL ACTIVITIES

1. Numerical review of specific activities for the TEAM LEADER (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.	10,12,14		15	
2.1	21,22,27,28			
2.2	29,30,32,33			
2.3	47		41,45	
2.4	48		49	
3.1			63,76	
3.2	83			
3.3	97,98,99,100			
3.4	101		102	
4.	111,112,114			
5.1	131,137,139			
5.2	141			
5.3	151,153			
5.4	154		156	
6.1	181,182			
6.2	184		185	
6.3	186		188	

* numbers between brackets are to be regarded as optional

2. Numerical review of specific activities for the KEY MEMBERS (cf. Annex I)

Stage & Step	Main responsibility for:		Collaborating in *:	
	interdisc. activities	own activities	interdisc. activities	other activities
1.			(15)	
2.1	23,24		27	
2.2				
2.3			45,47	
2.4			49	
3.1	60		61,62	932
3.2			83,86,87,90, 91,92	933
3.3	97,99		98,100	935
3.4			102	
4.	112,113,114			
5.1	131,132,137		139	
5.2			141,151	
5.3	152,153			
5.4			156	
6.1	182,183		181	
6.2			185	
6.3	186,187			

* numbers between brackets are to be regarded as optional

GLOSSARY

ACTIVITY

An identifiable work component in planning or project management. Activities require resources such as time, labour, equipment, energy; they are the major elements in network analysis.

AD HOC REGION

A region defined on an 'ad hoc basis', e.g. depressed areas or areas devastated by natural disasters.

AGGREGATION

The merging of local plans into entities at the sub-regional, regional, sectoral, or national level.

BOTTOM-TO-TOP PROCEDURE

Planning that starts at the lowest administrative level, aggregates local targets and objectives (translated into local projects/plans) into sectoral and regional plans, and integrates these into national plans. (Also termed Resources Procedure; see there).

BROAD FIELD

Major group of disciplines.

BUDGET

An estimate of the funds needed, in place and in time, for a given program of activities.

COMPREHENSIVE PLANNING

Planning that takes into account the social, economic, physical, and technical aspects of the Planning Object (see there).

COST/BENEFIT ANALYSIS

An analysis that provides an indication of the profitability of a given project. It results in a cost/benefit ratio, which is the ratio between the sum of the capital cost and the net benefits over the lifetime of the project. Costs and benefits are quantified as far as possible, and may be financial or social, direct or indirect.

CRITERION

Principle used to judge the relative degree of desirability among alternatives,

or the degree to which a course of action meets an objective.

DE-AGGREGATION

The elaboration of a general goal or program at a high administrative level of planning (e.g. sectoral or national) into specific objectives and projects at a lower administrative level of planning (e.g. regional or local).

DEFINITIVE GOALS, OBJECTIVES, TARGETS

Those goals, objectives, and targets that are accepted by the government at the end of the planning process, when it has been established that the means available are sufficient to make possible the achievement of a consistent set of goals, objectives, and targets.

DENSITY OF EVENTS

The number of development activities to be undertaken and the degree to which they are interrelated. If the events are numerous and strongly interrelated, a regional framework may be necessary to coordinate them.

DETAILED REGIONAL PLAN

A regional plan in which the programs of action are detailed to the level of identification of projects. Included are a network plan, the annual budget allocations per project, and a map indicating the location of projects.

DISCIPLINE

A specified branch of science, e.g. hydrology, health, agro-economy. In this book also used to mean the expert(s) who is (are) practising the particular discipline.

DRAFT PLAN (REPORT)

The interim plan (report) prepared by the planning team, prior to the Final Plan (report).

DYNAMIC ANALYSIS

An analysis that describes a given situation and also indicates the past processes that have shaped that situation.

END EVALUATION

The evaluation that takes place after the execution of the projects or programs. (cf. Evaluation).

EVALUATION

An assessment of the achievements of a program, a project, or planning activity. The main criteria for the assessment are:

- effectiveness: the degree to which the goals, objectives and/or targets have been achieved;
- significance: the relevance of the goals, objectives, and/or targets formulated or achieved in a larger context, e.g. the relevance of a regional target in relation to the national development plan;
- efficiency: the appropriateness of the methods and techniques proposed for, or used during implementation.

EVALUATION EX ANTE

Assessment of whether a certain plan (program or project) has been designed in a proper way. Evaluation ex ante takes place before execution starts (cf. Evaluation).

EVALUATION EX POST

Assessment of the program or project achievements after some or all plan activities have taken place (cf. Evaluation).

EVENT

An attribute of an activity that occurs at a particular instant in time. In projects, important events are the 'start event' (project commencement) and the 'end event' (project completion). (See also Activity).

EXECUTION

Work undertaken in accordance with a program of action (see also Implementation).

EXTERNAL EVALUATION

Evaluation of the development activities by persons or organizations not involved in the planning or execution.

EXTERNAL EXPERT

An expert not belonging to a country's own national administration.

FACET REPORT

Report of one discipline, to be amalgamated with others in the interdisciplinary interim reports at the successive stages of regional planning.

FEASIBILITY

A general term used in determining whether a certain project proposal and be executed and, if so, whether it is justified. The term 'feasibility study' applies to all aspects of a project, i.e. technical, financial, economic, organizational, and managerial.

FINAL REPORT

The document drawn up after receipt of approval of the Draft Report; it concludes the task of the planner or planning organization.

FUNCTIONAL PROCEDURE

Planning whereby at national level the functions that the various regions of the country will have in the national development process are defined. (Also termed Top-to-Bottom Procedure; see there).

FUNCTIONAL REGION

A region defined by the functional relationship(s) existing between parts of that region.

FUNCTIONALIZED RELATION DIAGRAM

A network diagram in which the disciplines that are considered necessary are marked on the vertical axis (grouped in functional blocks with a central block showing the interdisciplinary relationships) and the successive stages and steps are marked on the horizontal axis. The interrelations between the activities are represented by symbols.

FUTURE SITUATION

A description of the future situation that will come about as a result of the structures and systems imposed upon a region by the planning.

GOAL

A desired achievement, stated in qualitative terms.

HOMOGENEOUS REGION

A region within which one or more characteristics (such as climate, soil, production structure, religion) vary only, within some specified range.

IMPLEMENTATION

All those operations and activities that are to be executed, beginning with the acceptance of a given plan by the government, followed by the execution

of the projects or programs, and concluding with an End Evaluation.

INCEPTION REGIONAL PLAN

A regional plan that presents a broad assessment of the major potentials and constraints for development, and outlines the most important development activities.

INCEPTION REPORT

The first interim report produced by the regional planner (at the end of the reconnaissance stage: stage 2). It contains a first assessment of the major development potentials and constraints and the main ideas for development. If the reconnaissance indicates that the planning exercise should be interrupted or terminated at this stage, the Inception Report should also describe any projects and programs that can be executed.

INTEGRATED (REGIONAL) PLANNING

Planning whereby the regional plan fits into the framework provided by other governmental plans, (national, sectoral and local). In other words, the goals and objectives of the national, regional and sectoral plans are in concord with one another, and the local plans fit into the regional plan and vice versa.

INTERDISCIPLINARY PROCEDURE

A procedure followed by two or more disciplines with a purposeful pattern of cooperation, usually resulting in a jointly-produced item of information.

INTERIM EVALUATION

Evaluation performed during the preparation or implementation of the development activities.

INTERNAL EVALUATION

Evaluation performed by the persons or organizations involved in planning or implementing the development activities.

ITERATION

Procedure for optimizing complex sets of interrelated data by successive approximations, the approximated values being returned from the second to the first set, and so on until the values alter relatively little or not at all.

KEY GROUP

Working party consisting of the team leader and the key members (see there).

KEY MEMBER

Senior member of the planning team who is appointed coordinator for the disciplines within a Broad Field (see there).

LINEAR PROGRAM

A mathematical procedure of determining an optimum program for a set of interdependent relationships represented by linear equations.

LOCAL PLANNING

Planning in which the planning object is located at or under the lowest administrative level of a country. The planning subject can be at the local administrative level, but can also be at the regional, or even the national administrative level.

LOCAL PLANS

Plans developed under local planning and indicating the detailed programs of action by which well-defined quantitative targets can be reached within a specified time.

MACRO LEVEL PLANNING

Planning in which the planning object is a Macro Region; (see there) such a region is too large to detail the plan to the level of project identification.

MACRO REGION

A rough territorial subdivision of a country. A macro region contains 1 million to 10 million people and covers a large tract of land. This subdivision is used for large countries like India and China.

MACRO REGIONAL PLAN

Plan resulting from Macro Level Planning; they have the characteristics of national plans.

MAINLY RESPONSIBLE DISCIPLINE

The 'Discipline' (see there) mainly responsible for a certain planning activity; he is responsible not only for his own contribution, but also for coordinating the contributions from other disciplines participating in that activity.

MESO LEVEL PLANNING

Planning in which the planning object is a Meso Region (see there).

MESO REGION

A subdivision of a Macro Region (see there). A meso region contains 300,000 to 1 million people, has at least one major centre (50,000 to 200,000 inhabitants), and covers an area of 250,000 acres to 2,500,000 acres or more.

MESO REGIONAL PLAN

Regional plan resulting from Meso Level Planning. It will contain identified projects and specific programs of action, with a description of their interrelationships.

MICRO LEVEL PLANNING

Planning in which the planning object is a Micro Region (see there).

MICRO REGION

A subdivision of a Meso Region. (see there).

MICRO REGIONAL PLAN

Regional plan resulting from Micro Level Planning. It will contain, in most cases, a number of mutually adjusted local plans that have been worked out in such detail that cost/benefit calculations can be made.

MULTIDISCIPLINARY PROCEDURE

The procedure in which a number of different disciplines work together without an explicit pattern of cooperation. Their findings are brought together in a cumulative way.

NATIONAL PLANNING

Planning in which the plan object is the country as a whole. The plan subject is located at the national level. National planning results in a framework for national development, either based on, or giving guidelines for, sectoral and regional plans. It conceives general programs of action to attain previously defined goals.

NATIONAL PLANNING AUTHORITY

The authority in charge of national planning in general, and of drawing up and implementing the national plan in particular.

NETWORK ANALYSIS

The analysis of a project or process into its component parts (cf. Activity) and recording them as a network of sequential and interconnected paths. The activities and their relationships are shown schematically (see Network Diagram).

NETWORK DIAGRAM

The graphical representation of activities and their sequential relationships, providing a visual insight into the structure of the planning process.

NODAL REGION

A region that possesses a centre (node, urban area) which performs certain functions for the region (cf. Functional Region).

OBJECTIVE

An aim that one hopes to achieve. An objective may be derived from a Goal (see there); it is more specific than a goal, although not necessarily expressed quantitatively.

OBLIGATORILY ASSISTING DISCIPLINE

A discipline that is obliged to assist in the performance of a certain planning activity; he must provide the Mainly Responsible Discipline (see there) with his contribution.

OPTIMIZATION

The procedure of selecting the 'best fit' out of a range of alternative programs, i.e. of maximizing the benefits in proportion to (scarce) resources.

OPTIONALLY ASSISTING DISCIPLINE

A discipline that may be called upon to assist in the performance of a certain planning activity at the discretion of the Mainly Responsible Discipline (see there).

PERSPECTIVE PLAN TIME HORIZON

The time horizon adopted for a long-term perspective plan; it may cover 15 to 25 years.

PLAN

The document resulting from a completed planning exercise. It contains:

- a dynamic analysis of the situation;

- a statement on the goals, objectives, or targets to be achieved;
- a description of projects and programs of action to be undertaken to achieve the goals, objectives, or targets, mentioning the means to be used, where, when, how, and by whom.

PLANNED DEVELOPMENT

A continuous cyclical process in which the following phases occur in each cycle:

- formulation of goals;
- stocktaking, research, and surveys;
- drawing up a plan;
- acceptance of the plan;
- execution of the plan;
- evaluation.

PLANNING

A process that comprises:

- the formulation of goals;
- stocktaking, research, and surveys;
- drawing up the plan;
- evaluation of the planning components;
- the formulation of the development program.

PLANNING OBJECT

The area, or group of persons for which a plan is made.

PLANNING SUBJECT

A government organization or group of experts charged by the government with preparing a plan.

PLANNING TEAM

An agency, organization, group of experts, or a combination of these charged with the preparation of a plan.

PLAN OF OPERATION (OR PROJECT DOCUMENT)

A document containing the formal agreement between the government (or other principal) and the planning agency, setting out the terms and conditions of the plan preparation and the respective responsibilities of each party.

PRECEDENCE NETWORK METHOD

One of the methods of representing the project planning in diagram form (network). Each activity is depicted in a 'box' and relationships (precedences) are indicated by dependency lines.

PROGRAM

An organized aggregate of activities directed towards the attainment of a defined objective. Programs are usually implemented through a number of related projects. The term also applies to groups of activities that are designed to provide service and support (administration, personnel, budget, etc.).

PROGRAM OF ACTION

Short description of all the projects and project elements that can be identified as such including the cost estimates for investment, operation and maintenance; the proposed timing of realization, the personnel needed, etc.

PROJECT

A set of interrelated development activities and resource inputs which can be separately planned, analysed, implemented, and operated; designed to achieve clearly defined objectives (targets) over a specified time and at a specified cost.

REGION

In this book the term region is used exclusively in the sense of a subnational geographical unit.

REGIONAL PLANNING

Planning in which the planning object is a Region (see there).

REGIONAL PLANNING COMMISSION (Council or Committee)

Commission (council, committee) of officials appointed by the Government, to guide and supervise the regional planning in one (or more) region(s) of the country. Possible members are: representatives of the national planning authority, of national or regional government departments, local leaders, etc.

RELATION DIAGRAM (or DEPENDENCY GRAPH)

An initial network graph depicting the sequential relationships (dependencies) between the identified activities. The latter are indicated by numbered symbols and their relations by dependency lines. In such a graph, the duration of the activities is disregarded.

RESOURCES PROCEDURE

Planning that is based on an assessment of the resources of the region (physical, economic, and social). (Also termed Bottom-to-Top Procedure; see there).

RIVER BASIN

A region defined by its hydrological coherence.

RURAL-ORIENTED REGIONAL PLAN

A plan that focuses on the agricultural sector and the rural areas of a region. Such plans may also identify developments that will take place in the urban centres, but will not elaborate them into programs of action.

RURAL-URBAN-ORIENTED REGIONAL PLAN

A plan that treats the development in the rural and the urban areas of a region at the same degree of detail; programs of action are prepared for both.

SECTORAL PLANNING

Planning in which the planning object is one of the socio-economic sectors of the country. Sectoral planning coincides, in most cases, with the planning of a ministry or department responsible for that sector or group of sectors. The planning subject is situated at the national administrative level, in a ministry or department, sometimes in a national planning agency.

SKELETON REGIONAL PLAN

A regional plan that outlines the future structure of the region, the major programs of action, and the major projects. It may be an elaboration of the Inception Regional Plan (see there).

SKELETON REPORT

The second interim report produced by the regional planner (at the end of the main field study: stage 3). It is an elaboration of the Inception Report (see there), and contains a comprehensive dynamic analysis of the region, a description of the more promising development proposals and projects, a tentative formulation of the selection criteria for projects and programs, and a proposal for possible development strategies.

STAGES OF PLANNING

The subdivisions that can be made in the planning process.

STEPS

Subdivision within a planning stage (see Stages of Planning).

STRATEGIC PLANNING

Planning that results in general programs the direction in which development should move. Strategic planning takes place in national, sectoral, and regional planning.

STRATEGIES

The approaches and methods chosen or developed to reach the goals of a development plan.

SUBNATIONAL REGION

A region that is part of a country.

SUPPORTING AGENCY

An outside agency for technical or financial cooperation, e.g. through multi-lateral or bilateral programs.

SYSTEM

A set of parts and their mutual relationships, coordinated to accomplish a set of goals.

SYSTEMS APPROACH

Methodology to identify all active factors of a system (cf. System).

TACTICAL PLANNING

Planning that results in specific and detailed programs of action indicating precisely what has to be done, by whom, when, and where, what means are required, and how they should be used.
This type of planning is mostly applied in local and sometimes regional planning.

TARGET

A precise, and usually quantitative statement of what one hopes to achieve. Targets are short-run results, often derived from objectives, but are more specific.

TARGET PLANNING

A program of (development) activities in which the use of inputs is linked to the pursuit of planning targets.

TENTATIVE GOALS, OBJECTIVES AND TARGETS

Those goals, objectives, and targets that are given by the principal at the beginning of the planning process. They remain tentative until it has been shown that they are consistent with the means available.

TERMS OF REFERENCE

A document describing the commission that the principal (usually a government authority) desires to have undertaken; where possible the task description will be detailed, quantified, and timed.

TOP-TO-BOTTOM PROCEDURE

Planning that starts at the top administrative level and de-aggregates the national plan, by way of sectoral and regional plans, into local plans. (Also termed Functional Procedure; see there).

URBAN-ORIENTED REGIONAL PLAN

A regional plan that focuses on one or more cities in the region, emphasizing the development of the city or cities.

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See under (L) Secondary and tertiary production sectors.

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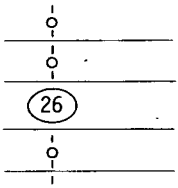
LEGEND to the diagram Charts I, II and III

(211) - 'activity' and corresponding number

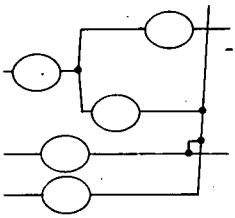
[27] - 'activity' entailing a work document



- multidisciplinary activity to be performed simultaneously (but independently) by the disciplines which are marked with knots on the dash line. One description only (here no. 26) holds for those disciplines together.

[45] or ((28)) - activity implying a general team meeting

[[47]] - issue of an interim repport



- lines interconnecting the 'activities' represent their mutual sequence (time axis from left to the right). To avoid an excess of lines these are combined where applicable. The branching or joining of lines is indicated with a dot; this implies that other line crossings have no special meaning.