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Information System for the North-East Provincial Administration

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<u>Contents</u>	<u>Page</u>
1. Purpose and Approach of Consultancy	2
2. Basic Background Information	3
2.1 Government Structures and Legal-Administrative Framework	4
2.2 IS-supported Development Planning System	6
2.2.1 Provincial Planning	7
2.2.2 District Planning	7
2.2.3 Divisional and Local Government Planning	8
2.2.4 Current Status	8
2.3 Finance and Budgeting	10
3. Necessary Common Understanding of Conceptual and Terminological Issues	11
4. IS-Related Activities, Planning and Monitoring in NEP	14
4.1 Previous Efforts	14
4.2 Assessment of new NEP Initiatives on IS and Computerisation	15
4.3 Monitoring	20
5. Summary of Major IS-related Weaknesses in NEP	23
6. Recommendations	25

Annexes

A 1	Terms of Reference
A 2	Mission Schedule
A 3	Workshop Paper: Presentation and Discussion of Findings and Recommendations
A 4	Workshop Participants
A 5	Documents Consulted
A 6	NEP Administrative Structures
A 7	Basic IT/IS Terminology
A 8	Example: Approach to Preparation and Stepwise Implementation of an IS & IT Framework Plan

1. Purpose and Approach of Consultancy

The consultancy mission has been carried out within the framework of the GTZ-supported IFSP Trincomalee, based on a request of the North-East Provincial Administration (NEP) / Provincial Council (PC) for services related to designing, developing, and installing an information system (IS). The consultancy is to be taken as first rough approach towards briefly assessing conditions and efforts to establish an IS for NEP and fostering communication among institutions involved for broadening the base for an IS with the following main tasks (for full Terms of Reference see ANNEX 1):

- review on-going IS-planning;
- review information needs at various user levels within NEP hierarchy;
- review data availability and sources;
- review reporting requirements and formats;
- assess IS options (e.g. with respect to physical and financial planning and monitoring);
- look at information requirements of projects and donors;
- highlight aspects of effective and scheduled IS introduction;
- summarise findings, priorities, conclusions.

A logical link to IFSP exists via intentions to establish a monitoring system which is expected to form a future component of NEP-IS (monitoring as IS module).

Based on previous communications (verbally and in writing) with the GTZ project leader, Dr. Dedo Geinitz, on requirements of the mission to be met a meeting has been held with him on 18 August in Germany during preparations made for the consultancy. The reporter spent 10 working days in Trincomalee from 22 to 31 August (altogether 18 days). Major local partners met for discussions comprise (with regard to time constraints and complex NEP administration it was not possible to contact all parties concerned; a mission schedule is attached as ANNEX 2):

- IFSP Project Director;
- Deputy Chief Secretary - Planning;
- Chief Secretary;
- Hon. Governor;
- Deputy Chief Secretary - Finance;
- Var. (Deputy) Directors and Project Officers - Planning;
- Directors Finance (Budget; Revenues; Accounting);
- Var. Members of NEPC Computerisation Committee (Heads of Departments);
- Directors (Planning; Educ. Develop.) - Ministry of Education;
- Asst. Director Planning - Ministry of Health;
- Prov. Director of Agriculture;
- Asst. Secretaries Provincial Public Administration.

The reporter would like to express his profound gratitude to staff and representatives of all contacted NEP institutions as well as to GTZ project staff for their valuable help and permanent support during his stay in Sri Lanka.

The outcome of the consultancy mission has been presented and discussed during two workshops held at the Planning Secretariat on 29 and 30 August. For this purpose a workshop paper has been prepared and distributed to the participants with the agreed working title *Strengthening of Information Resource Management (IRM) within North-Eastern Provincial Administration* which is attached as ANNEX 3. Workshop participants are listed in ANNEX 4.

Major documents used/reviewed during the mission are shown in ANNEX 5.

It should be emphasised that the German Government/GTZ has not made any financial commitments with regard to future IS-related technical assistance to NEP.

2. Basic Background Information

2.1 Government Structures and Legal-Administrative Framework

For the purpose of outlining the boundaries and potential use/functions of a provincial IS it is important to look into the institutional landscape and structure of government administration in Sri Lanka actually comprising hierarchically the National, Provincial, District, Divisional, and Local Authority levels.

Prior to devolution of power starting more than a decade ago there have been highly centralised national and regional institutions, systems and processes with top-down sectoral programmes formulated and implemented from the centre through line ministries. The district was the focal administrative and political unit at sub-national level. A deconcentration of central government's administrative machinery, however, took place through the establishment of branch offices by central line ministries at subnational level. To date such branch offices have remained as integral parts of the central ministries while the decision-making process still remained top down.

The system of administration in Sri Lanka through Provincial Councils (PC) was introduced in 1988. The 13th Amendment to the Constitution devolved more autonomy to 9 newly established Provincial Councils by defining limits and extent of functional and fiscal autonomy of those councils. Two parallel systems of government administration have emerged since then at central and provincial level each with its own associated administrative machinery. In addition there is the long tradition of local governance through a variety of institutions.

The top-down relationship between the central ministry and its branch offices was affected by the devolution of some of their functions to provinces. Provincial departments have been set up accountable to the newly established Provincial Councils. The District Secretary (formerly the Government Agent) is the representative of the central government in the district and responsible for coordinating activities of central government institutions performing non-devolved functions in the district. Divisional Secretaries function as administrative arm of both the central government and the PC. Through the 1992 Transfer of Power Act more functions were made the responsibility of Divisional Secretaries. The area of

operations of the Divisional Secretary (DS) closely corresponds to the area covered by a Pradeshiya Sabha (PS) as elected local government unit delivering services to the community. At present linkages and coordination lines between PS and DS seem to be weak.

The devolution framework - which in practice is characterised by ambiguities in the provisions - is determined by three lists:

- Reserved List being the domain of the central government and including responsibility for national policy on all subjects and functions;
- Concurrent List for subjects with concurrent responsibility by PC and central government (e.g. agriculture, health, higher education);
- Provincial List including responsibility for implementation of economic plans and for planning in specified sectoral areas;

Latest government proposals on further devolution and extension of decentralisation in Sri Lanka assigning unequivocally responsibility for planning and implementation at the regional level to PCs (which would have implications on future political and administrative structures at regional and local levels as well as on design and functioning of regional/local planning systems with underlying information systems) have not yet been enacted by Parliament.

The administrative set-up in NEP is different as compared to existing structures in other provinces in Sri Lanka. By 1990 Gazette notification the NEPC Administration was brought under the Hon. Governor in absence of political guidance at the Council level (responsibilities assigned to the Provincial Planning Council are currently performed by the Governor and the Prov. Planning Committee which takes all final decisions in respect of development issues). Districts are run by Government Agents/District Secretaries appointed by the President and reporting to the Centre. Divisional Secretaries are also appointed by the Centre.

Major information-based policy instruments at Provincial level are the Annual Provincial Implementation Programme and Financial Statement (= Budget) supplemented by a variety of plans, programmes, and profiles at lower levels (see below).

NEP (an area of approx. 18 300 skm with 2.8 mio inhabitants) consists of 8 Districts (3 North, 5 East), 72 Divisions, and 71 Local Authorities (2 Municipal Councils, 6 Urban Councils, 63 Pradeshiya Sabhas). The effects of the long-lasting ethnic conflict in NEP between Sinhalese and minority Tamils are obvious at political and administrative levels and nearly paralyse social and economic development in the Province.

NEP institutions at provincial level comprise (according to Financial Statement 2000):

- Governor
- Provincial Audit Service
- Assembly Secretariat
- Provincial Public Service Commission

- Co-operative Employees Commission
- Chief Minister's Secretariat
- Chief Secretary
- Deputy Chief Secretary - Finance
- Deputy Chief Secretary - Planning

- Ministry of Agriculture, Livestock Development, Land, Irrigation & Fisheries
 - Department of Agriculture
 - Department of Animal Production and Health
 - Department of Irrigation
 - Department of Agrarian Services
 - Department of Land Administration
- Ministry of Education, Cultural Affairs & Sports
 - Department of Education
- Ministry of Health & Indigenous Medicine
 - Department of Health
- Ministry of Rehabilitation, Reconstruction, Social Welfare, Buildings & Women Affairs
 - Department of Social Services
 - Department of Probation & Child Care Services
 - Department of Buildings
- Ministry of Prov. Public Administration, Co-operatives, Local Government, Rural Development, Industries & Road Development
 - Department of Co-operative Development
 - Department of Industries
 - Department of Local Government
 - Department of Road Development
 - Department of Rural Development
 - Management Development and Training Department.

The year 2000 NEPC cadre position - covering administrative, planning and accounting services - shows significant vacancies (14 000 out of 54 000 approved posts).

Within the constitutional framework among others the following documents describe the current NEP regulatory setting (compare ANNEX 5) and provide the sources of authority:

- Chief Secretary, Planning Procedure as of 1.1.1999;
- Chief Secretary, Financial Rules North-East Provincial Council, 1993;
- Planning Secretariat, Operational Information 1998 (under updating);
- NEP Financial Statement (Estimates of Revenues and Expenditure for the FY 2000);
- Planning Secretariat, Annual Implementation Programme 2000 - NEP;
- Chief Secretariat, Divisional Annual Implementation Programme 2000 under Local Level Development Planning Process;
- Various Guidelines, circulars, directives, decisions, etc. as issued by relevant institutions.

An overview of the administrative structure of the North-East Province is attached as ANNEX 6. The 1998 Operational Information published by the NEP Planning Secretariat provides general information on the overall NEP organisation, the envisaged planning process, on financial performance and detailed information about the individual organisations and institutions forming part of the NEP, all supplemented by available selected statistics. The „Planning Procedure“ (although not fully in force) provides an outline of realities and visions in NEP in terms of institutions involved and instruments/processes (to be) applied.

In summary there is a very complex hierarchical system of line relationship (incl. appointment, command and reporting), inquiry and answer relationship as well as of coordination. The process of re-development and re-construction is on-going. There are still significant weaknesses and deficiencies hampering the functioning of the administrative machinery. For national and regional processes and structures to be consistent and supportive of government devolution and decentralisation efforts the linkages among national, regional and local development activities need to be strengthened (particularly in terms of integrating central top-down - macro - planning with local bottom-up planning). Further definition and clarification of functions and responsibilities of the different actors in the system and determination of political and administrative priorities is also needed.

2.2 IS-supported Development Planning System

The 13th Amendment to the Constitution provides under concurrent and devolved subjects the framework for planning and plan implementation by the Provincial Council which has been further elaborated by a variety of guidelines, circulars etc. as issued by the Centre as well as by regional authorities (as decided by the Provincial Planning Committee). Sub-national planning is generally to be based on existing administrative units of regional sub-division in Sri Lanka (including Provinces, Districts, Divisions, Pradeshiya Sabhas and Grama Niladhari Divisions) with broader regional issues being addressed e.g. through coordinated activities of several administrative and/or functional units.

Great importance seems to be given to the development of planning and management capacity at divisional level. The division is seen as the meeting point between national development strategy moving down through provincial and district levels and community development needs moving up from village level organisations such as Pradeshiya Sabah.

"Guidelines for Development Planning" have been published in 1999 by the central Ministry of Finance and Planning as an accompanying document to the Financial Management Guidelines which can also be used by Provincial Councils. They cover e.g. organisational responsibilities, elements of macro, sectoral and project planning, the project cycle as well as the subnational planning process. A rough outline of the latter is given below.

2.2.1 Provincial Planning

With the 13th Amendment to the Constitution and the subsequent introduction of the Provincial Councils Act No. 42 (1987) the concept of provincial planning has been made the responsibility of Provincial Councils. The Amendment also set up the Finance Commission which was given the power to allocate funds from the national budget for implementing provincial plans (with the objective of achieving balanced regional development).

Major provincial planning institutions consist of the Provincial Planning Committee (chaired by Chief Secretary and Deputy Chief Secretary - Planning as its Secretary); the Provincial Planning Council - not yet in NEP - for approving development priorities, policies and plans; and the Provincial Planning Secretariat (headed by Deputy Chief Secretary - Planning) as technical organisation being responsible for carrying out provincial planning functions and related activities as well as supporting planning activities at district and divisional levels and interacting with line ministries.

Major IS-related functions of the Provincial Planning Secretariat include

- conduct socio-economic surveys, collate and analyse data in order to develop a well-structured information base for planning;
- prepare medium-term Provincial Development Plans and Annual Implementation Plans (to be submitted to and finalised in terms of funding by Finance Commission);
- monitor and coordinate the implementation of plans/programmes/projects and evaluate benefits;
- build planning capacity at provincial and sub-provincial levels.

With regard to major steps traditionally involved in preparing Provincial Development Plans a functioning IS is supportive especially to

- the situation analysis as process starting point (identification/assessment of provincial strengths, weaknesses, potentials etc.) with all relevant general and sector-specific data and information collected and entered into a comprehensive data base system;
- the determination of progress indicators and milestones for project / programme implementation to facilitate monitoring;
- the preparation of the Investment Plan;
- the coordination and monitoring of all projects funded by the Province (and the Centre).

2.2.2 District Planning

The formulation and monitoring of District development and implementation programmes became the task of district planning institutions already two decades ago. Following the 13th constitutional Amendment the reserved subjects and to a certain extent the devolved subjects assigned to Provincial Councils should be coordinated at District level by responsible planning institutions (District Co-ordination Committee and District Development Committee as main sub-committee; the District Planning Secretariat functions as Secretariat for both).

Major IS-related functions of District Planning Secretariat include

- formulate and monitor district development and implementation programmes;
- prepare consolidated progress reports for use of district, provincial and national agencies;
- compile and maintain a District database to facilitate planning, monitoring, and dissemination of relevant information to all public and private sector institutions concerned;
- cooperate/coordinate with provincial and national planning agencies.

2.2.3 Divisional and Local Government Planning

There are two types/levels of institutions responsible for planning, execution, monitoring and coordination of development activity at local level (divisional and local government levels):

- system of Divisional Secretary's Office under the District Secretary which is directly linked with the centre;
- local government institutions which are directly linked with the provincial system.

Divisional planning institutions comprise the Divisional Coordination Committee (interacting between the two levels of planning organisations) and the Divisional Planning Committee (mainly for finalising local development plans for the divisional area). The Divisional Secretary functions as Secretary to both committees.

Major IS-related functions of Divisional Secretariat include

- prepare Annual Implementation Plans and monitor implementation (according to guidelines set out by the centre);
- prepare a Resource Profile for the Division as important planning activity (collect, update, compile, analyse and disseminate social, economic, environmental and demographic data and information).

Local government institutions also being empowered to undertake development planning activities comprise three levels, namely Municipal Councils, Urban Councils, Pradeshiya Sabhas. Major IS-related functions of these institutions include

- formulate Four Year Development Plan;
- prepare Annual Implementation Programmes (to be financed from Local Authority and Provincial Council Funds);
- formulate (in consultation with central agencies) physical (land-use) plans by zoning areas for designated purposes.

2.2.4 Current Status

In general the current national and regional development planning processes still have to be made more responsive to current devolution efforts by formulating,

revising, harmonising guidelines, rules and regulations and implementing mechanisms. On the part of the PC in order to exercise new authorities, functions and resources (still to be) transferred by the centre identified staff and capacity building requirements have to be met including a well-functioning information system needed for effective planning and management of development in the province.

The (envisaged) NEP process of planning and implementation incl. District and Divisional levels, the institutions involved with their roles and responsibilities as well as the instruments to be deployed are described in a publication of NEP Chief Secretary (Planning Procedure, 1999).

Due to well-known constraints and limitations an effective fully-fledged provincial planning process has not yet been established. The envisaged system components are at various stages of installation. The currently existing basic system evolved during the last seven years requires further refinements for meeting future demands under normal conditions allowing the operation of an envisaged rational provincial planning system.

The Provincial Planning Secretariat (PPS) - headed by a Deputy Chief Secretary for Planning and reporting to the Chief Secretary - is in overall charge of coordinating and facilitating planning and programme/project implementation in the Province. It prepares the provincial Annual Implementation Program. There is currently no medium- or long-term development planning which provides the overall framework.

An up-dated NEP Statistical Handbook 1999 has been published by PPS in view of obvious needs of various organisations involved in development work, research, planning and administration (but also complaining about lack of communication facilities and delayed response from agencies hindering the improvement of the handbook). It is a compilation of more or less useful tables covering more than 20 sectoral fields, but providing only collected figures, no analysis. Key socio-economic indicators are missing, and the publication is partly suffering from methodological deficiencies.

PPS functions need to be further clarified and necessary resources be provided to function effectively. This includes strengthening the staff capacity and skills and the establishment and operation of mechanisms and processes supported by a well-designed IS by which it can better discharge its responsibilities for guiding public and private investment decisions according to provincial development priorities.

in 1999 the North East Provincial Administration (by circular of the Chief Secretary) has decided to shift the focus of the Local Level Development Planning Process from the Divisional Secretariats to the level of Pradeshiya Sabhas. For this purpose it is considered necessary to integrate different planning procedures adopted at local level. This new process shall also supplement the national level efforts on devolution and decentralisation of functions and responsibilities to elected local institutions. Preliminary guidelines outline the process of installing the new development planning approach which also requires the definition of process

stages, roles of institutions and stakeholders involved as well as of instruments, tools techniques to be deployed.

Core element of the new divisional planning process is the preparation of a 4-year development plan for each Division on a rolling basis as framework for Annual Implementation Programmes. As basic planning prerequisites are mentioned in the Circular the preparation and updating of

- Divisional Profiles (as responsibility of Divisional Secretaries based on existing procedures and instructions);
- Divisional Data Bases (instructions for Divisional secretaries to be issued by Provincial Planning Secretariat).

The Circular also provides an Index with over 30 numbered sectoral categories and additional activities and code numbers as well as various planning, financing and reporting forms. Beginning of 2000 workshops have been conducted with local government officials on how to build the database (see also chapter 4.2).

2.3 Finance and Budgeting

An important purpose/feature of an IS is also to support and facilitate budgeting and financial monitoring. In Sri Lanka there are two main sources of financing for provincial development activities: investment proposals of national importance are financed directly by the centre through the national budget; other proposals of regional importance through Provincial Funds (centre grants; provincial taxes and revenues; loans from Consolidated Fund, other). The central government also transfers block grants for recurrent expenditure. Revenue collection in the Northern and Eastern Provinces continues to be a function of the central government.

In view of the heavy dependence of Provincial Councils on the central government for financial resources the latter continues to be a key player in province development. The bulk of inflow of capital funds to PC comes as governments PIP grants (criteria based grant and matching grant) for projects identified by central line agencies. Only a small fraction of investment is undertaken by PC. Recommending grants to meet the expenditure requirements of PCs is the task of the Finance Commission.

Despite devolution there also seems to be little or no consultation with PC in the design and implementation of projects. PCs function as implementing agencies of line ministries for capital projects assigned to them by the central government. There are also not yet proper mechanisms to integrate provincial investment needs into the overall public investment programme of the central government. Announcement of measures, however, have been made to enhance the participation of PCs in national investment largely by transferring the entire responsibility of the operation of the Medium-term Investment Programme from the central government to the PCs.

The Central Bank in its 1999 annual report confirms the limited scope for PC resource allocation, inadequate powers for resource mobilisation, dominance of central government as a source of funds, and stresses the need to reform the

current PC system to reduce dependency as well as to permit them to implement their own investment programmes within a co-ordinated national plan.

The government/provincial budget is the principal administrative instrument for translating public investment programs (derived from longer-term plans/programmes) into concrete action, but the link between the two needs to be made very strong. A suitable organisation of budget and plan offices (Provincial Treasury and Planning Secretariat) has to ensure necessary integration of budgeting and investment planning functions and implementation incl. provision of qualified staff and establishment of proper procedures.

Irrespective of such organisational issues/structures the conformity of budget and investment program categories is important for their integration. An appropriate classification of budget items is generally necessary for that purpose (e.g. by type of expenditure and spending agency; by functions; by economic categories etc). Suitable classification and coding systems facilitate planning and management and improve the integration of investment and budgeting.

In 1999 the central Ministry of Finance and Planning published a revised Financial Management Code which shall replace the Financial Regulations issued in 1992. Operational details are set out in a series of Guidelines. The Code and the Guidelines coming into force in 2000 are binding on all Government Ministries, Departments and state employees. The Provincial Councils and Local Authorities are encouraged to adopt both the Financial Management Code and the Guidelines. The new classification and object coding is being used by NEP Treasury since this year.

Progress in integrating investment programs and budgeting does not only depend on the availability of suitable financial management capabilities but also on strengthening financial information systems based on modern government accounting systems (with focus on measurement of operational results). By setting up electronic data processing systems the compilation and consolidation of data can be speeded up and financial reporting be improved in terms of accuracy and reliability. The use of such EDP systems requires, however, well-organised and rationalised procedures, standardised practices, well-trained staff and an efficient communications system.

Concerning computerised government accounting several software packages are being used in Sri Lanka. The main accounting database system is CIGAS (Computerised Integrated Government Accounting System) which is used at the Treasury as well as in all Ministries, Departments, District and Divisional Secretariats. The system also provides inputs for another system (CIG-FMIS) generating key Financial Management Information.

3. Necessary Common Understanding of Conceptual and Terminological Issues

Information processing and communication systems are playing an increasingly important role not only in private industry and commerce, but also in government

in order to gain important advantages in areas that matter to the respective organisation (depending on its "business strategy" in a broader sense).

Key question is how the NEP Administration can realise operational and strategic opportunities and advantages provided by a well-functioning information system (IS) and underlying information technology (IT) which are vital to its long-term success (a question obviously difficult to be dealt with under the current political - transitional - situation). Emphasis should be placed on mainline activities of the organisation that are directly involved in the output of the organisation and that can really contribute to the success of NEPC in fulfilling its functions. For this purpose the NEP Administration has to identify and specify these critical success factors within the framework of its mandate as outlined above (e.g. quality of planning process; investment programming; implementation and monitoring systems; administrative-human resources support systems).

The term Information Resource Management (IRM) is used to describe the function that manages, organises, and coordinates the data resources so that it best support organisational and managerial activities. An information system is a set of inter-related and interacting components resulting from this IRM function (e.g. data, human resources, organisational structures, computers, telecommunications).

In building an IS emphasis should be placed on the perspective of various users of information and business needs and services. Suitable information technology is only a tool to make the needs-oriented system functioning (the term information system is not identical with use of computers). Technology is a powerful means to assist the organisation to do things better, faster, cheaper - but not as an end in itself.

Major purposes of introducing new information systems should be e.g.

- to support developing planning, leadership functions, policy-making capacity (responding to future economic and social challenges);
- to improve quality and transparency of government decision-making and strengthen relations between various levels of government.

IS-requirements at various organisational levels are determined by a mixture of different factors, which can be described e.g. by

- type of tasks (formalised, standardised, structured vs. unstructured, special matters);
- degree of complexity (low to high);
- information needs (determined vs. undetermined);
- parties involved (fixed vs. changing);
- availability of solutions (clear vs. open).

The information system can be considered as central nervous system of the organisation through which data and information is collected, transmitted, stored, manipulated, displayed and disseminated. A successful system has to adequately deal with routine data processing tasks (handling of routine transactions), but it has to be tailored to identified information needs of decision-makers within the specific organisation.

The process of designing the transaction processing system has to cover e.g.:

- data entry;
- structure and contents of database as an important strategic issue in the management of information systems (data organisation into different types of records with specific data elements/fields);
- database processing (efficient and effective access to the database as universal requirement of an IS).

It is useful to make a distinction between

- data-oriented decision support systems providing the decision-maker with selected information (summary reports, ad hoc queries, other kinds of reports) most of which be derived from raw data in the organisation's database, but with additional information also from other sources); and
- model-oriented decision support systems relying on some sort of model to predict e.g. the consequences of alternative courses of action or to forecast quantitative developments (e.g. specific spreadsheet programme forecasting agricultural volumes or financial flows).

The quality of information being used to support planning and policy development is closely related to budgetary and financial issues (here with shift of focus on results using indicators of performance). The financial management system therefore has major influence on general management structures and processes.

The structure and components/subsystems of the IS have to be in conformity with structure and procedures of the organisation itself and vice versa (the challenge consists in matching the structure of the IS with that of the institution). The design of an effective and efficient information system is obviously closely related to organisational issues (such as vertical and horizontal NEP political and administrative structures, centralisation vs. decentralisation, management philosophy and behaviour etc.) which affect the way in which the system should be designed and operated.

Depending on the size of the whole entity a system (like NEPC) may be composed of various parts (or subsystems) with each subsystem be expected to handle a portion of the system's activities. The division of tasks into subtasks is generally made for several levels in hierarchical form.

A system has usually a boundary that defines the activities considered to be integral parts of it. Everything not included within the boundary of the system constitutes its environment. The clear definition of the boundary of a system (and hence its environment) may be a difficult task also in the context of NEP. According to a general rule a system should include those activities over which a decision-maker exerts significant control (which of course is a relative matter!) leaving the remaining activities to form the environment (e.g. the Provincial planning process to be aligned and linked up covers planning and investment programming at Provincial, District, Divisional and Pradeshiya Sabha levels).

Starting point is the current NEP organisational setting, but IS planning and implementation might call for changes concerning structures, work procedures,

data flows, responsibilities etc.. The IS has to be embedded in an overall concept of performance-oriented administrative development.

Some basic IS/IT-terminology is compiled in ANNEX 7.

4. IS-related Activities, Planning and Monitoring in NEP

4.1 Previous Efforts

Efforts to build information systems in NEP go back to early 90's, unfortunately without major significant sustainable impacts on the current situation. The North-East Provincial Council from its inception started to establish a so called Operational Information System for day-to-day management purpose and policy making (Operational Room), but the manually maintained system faced severe set-backs and dismantling due to continuous conflict situations and civil disturbances.

In 1993 the Planning Division of the Ministry of Finance & Planning/NEP intended to undertake a detailed study and design of a comprehensive information system in the context of strengthening process and mechanisms for planning and management at provincial and local level (NEPIS: North East Province Information System). For this purpose a background paper prepared by the Regional Development Division of the Ministry of Policy Planning and Implementation on various aspects of a planning information system has been distributed by the Chief Secretariat to a variety of NEP institutions at different levels. The paper provides helpful theoretical guidance on various aspects of multi-level development planning, role of data and information and on characteristics/design/functions of a planning information system. It was accompanied by a checklist of important issues to be taken into consideration for the systems design. The possible framework of NEPIS was proposed to comprise various sub-systems covering sectoral information (Social, Agriculture, Fisheries, Industrial, Land use) as well as Provincial, District, and Divisional Profiles, Data Banks and Operations Rooms.

Based on a 1994 study on the computerisation of a NEP Divisional Level Data Base a software package has been developed with the purpose of facilitating the divisional planning process, especially the prioritisation of projects (using Visual Basic and MS Access for the data base tables). The package was tested, but did not come into operation. The system was planned to be used by Planning Secretariat officers with data base access and authorisation to manipulate data and by operational officers/data entry staff. The scope of the package should comprise the categorised divisional database itself with a large variety of sectoral tables, the processing of indicators for identified projects (facilitating the allocation of project resources among divisions), and the production of pre-structured reports at divisional, district and provincial levels. The data collection was planned to be carried out through designed questionnaires in cooperation with Divisional Secretariats (to be checked and authorised by Planning Secretariat).

In addition to above outlined IS efforts various sectoral approaches have started during the last decade, for example the development of a computer-based MIS for

the health sector as outlined in the following. Some functions of the central MoH were decentralised to provincial level, but information management at this level was neglected for a long time. In 1991 the Central Ministry of Health did provide some guidelines for developing a Provincial Health Information System in NEP and other provinces as sub-systems of the national health IS requesting a review of the existing system, the establishment of Information Units and data priorities as well as the organisation of regular flow of information.

In 1994 the provincial MoH reconfirmed to NEP Chief Secretary the importance of a computer-based IS for the health sector for the co-ordination and effective integration of provincial health agencies with the Centre (establishment, operation and maintenance of a comprehensive data base system; preparation of monthly / quarterly / annual progress and performance reports). In practice the operation of the already existing national health IS continued by-passing the provincial level. Data collected at grass-root/divisional level (on community health) and from hospitals were channelled only to district and national institutions. Some kind of ad hoc data collection has been done by the provincial administration.

Meanwhile nearly 50 data categories/tables have been developed for building the provincial data base (Provincial Health Profile by Districts covering demographic / health status, health services provisions, health care utilisation). Data collected by provincial MoH from districts (partly on paper, partly on diskette) is also being forwarded to NEP Planning Secretariat (just recently also electronically by means of telecommunication (the MoH computer room with 4 PCs is connected by modem) for statistical, monitoring and planning purposes. In order to further develop a comprehensive computer-supported IS the MoH is in need of institutional strengthening and capacity building incl. staff (in terms of quantity and quality).

4.2 Assessment of New NEP Initiatives on IS and Computerisation

Some kind of conventional reporting systems are available in most NEPC institutions, but in absence of a comprehensive IS concept significant amounts of data and information needed for planning, decision-making and monitoring are being collected ad hoc and not maintained and updated in a systematic and well-organised manner. A series of inter-related (partly overlapping) approaches and activities in order to remedy this situation have been initiated or started since last year.

In view of the unsatisfactory state of information system (IS) development in NEP a new concept note on NEPC-MIS has been prepared by the Planning Secretariat in April 00 - partly based on preparatory NEPIS work (see above) - with the aim of introducing an IS as decision support system at senior management level accommodating current flows of information as well as new information needs. The proposed approach aiming at an "one-stop information centre" (which "may need modification") comprises the steps of

- classifying decision categories and respective information needs by type of

- public sector functions (administration; routine service delivery; development programming, resources management; production & distribution; legal/regulatory functions);
- decision objectives (planning; operation; accounting) and categories for each objective (e.g. for operation: logistical issues like human resources and assets; plan implementation/monitoring);
- developing decision matrices by determining decision codes for key decisions (alpha codes), information category lists (with approx. 60 sectoral alphanumeric codes) and information codes to be used for the design of data collection sheets/tables;
- roughly outlining the vertical IS management structure comprising the provincial, district and operational/field levels with outputs of lower levels to be used as inputs to aggregated higher level layers of the system; for this purpose district level agencies are to be connected in terms of telecommunications to the respective provincial head offices (servers for sectoral databases), which in turn to be connected to a master server of the Planning Secretariat;
- outlining responsibilities for and the process of the expected operation of the system (data collection/verification/entry; periodicity; aggregation; reporting etc.).

Based on this concept paper workshops have been held with various sector institutions at local government level with the main purpose of designing data input sheets for a provincial database. The implementation of IS-related activities started at data entry level with data collection organised through the NEP Planning Secretariat using pre-designed tables. Structure and numbering of data forms have been drafted with codes and names of information as included in above mentioned NEPC-MIS concept paper (e.g. Group x; Decision Code POBRS1; Information Code IN32-04; Name of information). An ACCESS database is under preparation with tables and reports to be used at local and provincial levels as well as to be forwarded to the Centre.

In summary the notes provide useful intellectual inputs for analysing and understanding needs for and purpose of an IS. With trying to identify information requirements by anticipated hierarchical key decisions, however, it is considered by the reporter less useful for designing a powerful IS and a strategy/plan for implementation. The proposed approach looks impractical and seems to go about the IS design the wrong way. A desired data-oriented (as compared to a more sophisticated model-oriented) Decision Support System (DSS) should provide decision-makers with selected information, and in designing reporting systems for this purpose two types of error have to be avoided to the most possible extent:

- the failure to produce information considered relevant and useful by the decision-maker;
- the generation of information considered useless/irrelevant by the decision-maker.

The relevance of a given item of information depends on the details of the decision process for which the information is intended. It seems not to be possible to design an information supply system "clever" enough to know whether each conceivable

item of information will be valuable enough to justify generating and displaying it. Instead users must therefore make subjective judgements about what information to be reported. A good DDS should simultaneously increase the likelihood of displaying useful information while also reducing the volume of useless information, e.g. through the use of carefully designed periodic summary reports (also making available back-up details on summary volumes), ad hoc queries (allowing the retrieval of information that was not anticipated), exception reports (filtering out irrelevant information) - combined with graphical displays.

Instead of trying to define information aggregation categories that are judged appropriate for a pre-defined (more academic) type of decision (that is linking pieces of specific information to specific kinds/categories of decision) it is highly recommended to concentrate on building a flexible, user-oriented multi-purpose database system the content of which is considered the major strategic issue in the management of an IS. Such an IS - flexible enough to be able to respond to all operational demands - will also have to deal with unanticipated needs for information with data be aggregated and sorted by any combination of variables. Much of information to support decision-making at operational and tactical level has to come from the database almost always requiring some form of computation to summarise detailed data or to make projections using a specific forecasting method. At higher (often called strategic) levels in the IS hierarchy decisions become longer-term, broader and less susceptible to formalisation. They rely less on formal information in the database but instead often heavily depend on informal sources of external information.

The IS database(s) by providing a comprehensive representation of realities in the NEP (comprising a large variety of different types of relevant data) shall be used e.g. for assessing current conditions, analysing past events and trends, generating plans for future actions and controlling/monitoring the execution of plans / projects / programmes. The same database is to be accessed by different users for different purposes with different aggregation requirements. The dimensions of such operational data requirements can be expressed in terms of data

- availability;
- accessibility;
- completeness;
- accuracy; and
- consistency.

Nevertheless the database is not just a pool of unstructured data; it has to be organised in a way that facilitates access to selected parts. Effective data management (as one of the most critical enabling capabilities needed to develop a successful IS) includes a number of functions connected with the storage, retrieval and protection of the data resources. These functions are best be provided by means of a computer-supported database management system. The focus on data resources in IS design requires the preparation of a comprehensive description of the database for which powerful development tools are available. Major issues involved in this process are

- defining logical relationships among stored data elements (links among database records);

- applying common data definitions (standard definition/description of each data element is needed to avoid inconsistencies and to share data across applications and organisational sub-units within NEP Administration; it is the so-called data dictionary where information about content and structure of the database is deposited; it includes entries for each component of the database);
- sharing of common data (standard data definitions - as managed through the data dictionary - greatly facilitate data sharing thus reducing the redundancy of the database and saving data collection and storage cost);
- ensuring data independence (separation between the database and application programs increases the flexibility of the IS).

In the absence of an approved comprehensive IS/IT-strategy or plan an action plan for computerisation of the NEP Administration has been issued by the Office of Chief Secretary in 08/00 with focus on IS activities of technical Ministries and Departments. For the purpose of its implementation a Computerisation Committee with 9 members from various Min. & Dptms. and the Planning Secretariat has been established (Dep. Chief Secretary-Planning as chairman).

30 activities are listed in the Action Plan to be completed before end of this year (with determination of responsibilities and target dates) covering following priority areas:

- establishment of ministerial/departmental (sub-)committees for computerisation;
- assigning staff exclusively for data entry;
- building sectoral database (steps: preparatory work, design of data forms, data collection, data entry and transfer to sector ministry server);
- building HRD data base (steps: see above);
- building assets database (steps: see above);
- development of spatial data (village/divisional/district location codes; sector maps/sectoral atlas; linking to Annual Implementation Programmes and progress reporting; training);
- establishment of NEPC Web Site (identification of materials; design and construction);
- preparation and commencement of RAS (by provincial ministries).

Such an activity programme can not take the place of a well-designed plan aiming at providing a process and road map for implementing an IS that meets the broad needs of the NEP Administration. Nevertheless - although considered too ambitious in terms of time - it provides important building blocks to be integrated into a broader systematic concept by also explicitly spelling out in more detail how the NEP machinery shall be run in terms of information resource management. The need to build a provincial-sectoral database matching the information requirements at different operational and management levels has been fully recognised by key players in the NEP Administration. Related data form design and collection efforts (through local government level) are on-going within the framework of above mentioned approaches which require to be harmonised and partly revised. Further efforts at sub-provincial level are also made on updating Divisional Resource Profiles the design of which to the most possible extent

should be standardised across Divisions and made consistent with provincial databases/profiles in terms of structure and contents. This seems to be a major managerial and political IS issue.

Guidelines issued by the Planning Secretariat end of 1999 provide codes for 32 NEP institutions as well as for 7 sectors and sub-sectors which are - broken down by further sub-categories - also to be used for indicating activities under the Annual Implementation Programme. The current sector codes (which have partly to be adjusted to EDP requirements) comprise:

- 1 Agriculture (9 sub-sectors);
- 2 Industries, Tourism & Trade (11 sub-sectors);
- 3 Human Settlements;
- 4 Economic Infrastructure (4 sub-sectors);
- 5 Transport (3 sub-sectors);
- 6 Social Infrastructure (3 sub-sectors);
- 7 Administrative Overheads (3 sub-sectors incl. "Operational Information").

Since a couple of years the NEP Planning Secretariat has started to use modern information technology for entering and publishing data collected from various sources. Recently there have been activities within this Secretariat on establishing a geographical information system (GIS) using the software Arc View and digitalised paper maps in order to produce health graphics with data received from MOH. Similar approaches for the educational and agricultural sectors are under planning/preparation.

In 2000 also some kind of networking on ad hoc basis has been initiated by the Planning Secretariat in order to strengthen communications at provincial level (particularly with technical ministries like MoH). But the current equipment situation is not considered sufficient in order to cope with the tasks and workload due to be dealt with. In 1998 approx. 105 computers were distributed among all NEP institutions as listed under chapter 2.1. with most workstations used in stand-alone mode (e.g. 16 PCs at MoE, 3 at MoA, 6 at MoH, 2 at Provincial Public Administration, 5 at Treasury, and 6 at Planning Secretariat). Nowadays the latter has available 10 workstations (2 of which being used as servers) which are installed in two computer units (one with small hub-network and modem).

In order to serve as NEP's central nervous system the IS must tie things together through communications. Such communication is occurring within and among provincial key institutions, but is also going outside such organisational boundaries to other hierarchical levels (e.g. Districts, Divisions, Centre). Data and information enter the IS at various locations scattered vertically and horizontally around the Administration and must be communicated to other points in the system where it is needed, preferably in the future by modern telecommunication means instead of physical transport (on paper/discs). Linking stand-alone workstations through a telecommunication network provides access to and sharing of data (and other) resources at other locations.

The evolutionary development of such a communication network at acceptable cost, however, is a difficult issue requiring a careful design. It also comprises decisions on how a distributed computing system/architecture as vehicle by which

the IS reaches out to all identified parts of the NEP Administration shall look like. As outlined in Chapter 3. an IS as considered suitable for the NEP is composed of a hierarchy of interacting parts being too complex for direct implementation and therefore to be broken down into major sub-systems. A structure has to be chosen as basis for isolating such sub-systems enough to gain simplicity but at the same time to deal with the interactions that exist across sub-system boundaries. Building indirect links, e.g. through a shared database, greatly facilitates coordination among sub-systems while too many direct links produce complexity and problems of co-ordination.

4.3 Monitoring

In order to know not only where the NEP Administration wants to go but also where it has been and where it is sufficient attention has to be paid to the areas of collecting and analysing appropriate data for the purpose of monitoring progress toward plan, programme and project objectives. Effective monitoring depends on the adequacy of basic data-gathering systems, and without reasonably systematic data the provincial government cannot adequately address important issues as they arise.

The lack of reliable, up-to-date statistics and information - especially on main performance indicators - seriously handicaps monitoring activities, making necessary adjustments in policies, programmes and projects as well as formulating appropriate policies and development plans. The full potential of the monitoring function can be realised only when it is seen as an integral part of the management process. It cannot succeed unless its importance and usefulness is accepted by all parties involved. Sound management needs a good information system that provides an accurate reading of the status of implementation and of results being achieved.

Major questions concerning the general introduction and operation of a monitoring systems for various purposes comprise for example:

- what information is needed (data requirements);
- by whom (who are/will be the users);
- when/how often (timing);
- how it is to be obtained (responsibilities and methods);
- be processed (incl. computerisation);
- be documented;
- be analysed and evaluated;
- be reported/distributed (internally and externally) etc.

Monitoring systems currently in place or in the process of being introduced at various levels within the NEP Administration are mainly related to Annual Implementation Programmes (AIP) and individual activities/projects included in them. Within the context of the hierarchical provincial planning system as described above (compare Chapter 2.2) quarterly and annual progress/performance reports on AIP are to be submitted by sector agencies according to prescribed formats to the Planning Secretariat for further compilation; quarterly reports on consolidated District Implementation Programmes (to be

submitted by District Secretariat); and monthly/quarterly reports on divisional plans (by Division Secretariat). Reporting subjects are related to the flow/use of financial resources and the status of physical progress, both broken down by time intervals. For indicating the status of physical achievements codes are to be applied at provincial and lower levels (e.g. A for plan/design; B for call for tenders; C award of contract; D work in progress; F no progress). Identified shortfalls are also coded (e.g. by 1 material short.; 2 weather; 3 land acquisition; 4 liquidity problems; 5 lack of equipment). It is the declared NEPC intention of moving from purely financial and physical progress towards performance monitoring for which indicators are to be developed.

The current complex monitoring process can be best described by roughly outlining the system elements to be applied since 2000 for the divisional AIP under the local level development planning process (focus of which being shifted from the Divisional Secretariats to the level of Pradeshiya Sabhas according to 1999 Circular of NEP Chief Secretary which also provides 9 formats to be used for presenting and monitoring the AIP; see above 2.2.4):

- physical and financial progress report summary (by coded sectors and major sub-sectors according to annual allocation; target; performance; shortfalls);
- monthly physical and financial progress report (by Pradeshiya Sabha) with 16 columns and codes provided for physical achievements and shortfalls);
- quarterly progress report (consolidated by Commissioner of Local Government and be submitted to Provincial Planning Committee);
- quarterly benefit monitoring (by Pradeshiya Sabha with verifiable indicators, means of verification, benchmark and achievements);
- work completion report;
- 2 annual evaluation reports by Divisional Secretariats (one with tabulated information on assets created and sector analysis; the other covering an analytical assessment according to contents structure provided).

From the reporter's point of view (it would go beyond the scope of his consultancy mission to deal with this subject in more detail) the described system covers a variety of aspects considered relevant for an effective monitoring. The questions arise, however, whether such a - somehow sophisticated - monitoring reporting system including benefit monitoring and evaluation is simple and operational enough to be run e.g. at local level and whether sufficient capabilities are available to produce the results expected from/needed by various pre-clarified users. Firm administrative commitments and clear institutional arrangements are prerequisites of effective and efficient implementation, accompanied by sufficiently qualified staff to operate the system. The success of any monitoring system in meeting its major functional requirements depends mainly on the organisational arrangements and the working relationships on which it is based, but also on appropriate definitions and suitable technical concepts (especially when more than supervision of timely progress of physical work and of corresponding financial resources is involved). And monitoring shall not be just another data-gathering effort (the requirements of which to be adapted to realistic standards of accuracy, timeliness, and cost), but provide the database for steering and decision-taking. It seems that in NEP that

large amounts of (reliable?) data are collected only, but not sufficiently processed (also due to staff deficiencies) with the aim of influencing management decisions.

Midst of 2000 (during a Provincial Steering Committee meeting on IRDP and foreign-funded projects) a decision has been taken to monitor and review such programs and projects implemented by NEPC institutions. A progress reporting format has been distributed for this purpose to be submitted to the Chief Secretary (with copy to the Planning Secretariat). Donor-funded projects are not included in the AIP (besides general relations with international organisations like ADB and WB currently there are only two such major programmes under implementation at district level: the GTZ-supported IFSP -Trincomalee, and the Development and Rehab. Programme for Batticaloa District, funded by Norway).

In this context, too, a functioning monitoring system shall provide an early warning about actual or potential problems based on a set of suitable but simple indicators that can be collected and processed in time for management to take necessary action, but shall also measure impacts resulting from implementation. At project level different types of projects need for this purpose different information systems (for example well-established standardised systems for traditional infrastructure projects vs. information systems being sensitive to local circumstances and facing the problem of keeping accurate records at local level, e.g. for people-oriented projects like IFSP that include the provision of services by many agents in geographically scattered areas).

The general purpose of Monitoring and Evaluation (M&E) at project level is to provide the data base considered necessary mainly for project steering and decision-taking during the implementation phase (i.e. identification of deviations from plans, corrective actions, determining and evaluating project impacts, replanning etc). Controlling is carried out by project management, special project units and superior institutions such as executing agencies, supervisory bodies and donor institutions.

Preliminary steps in designing/setting up a M & E system are related to:

- systematising basic project characteristics incl. timing of individual project components;
- examining/clarifying implementation responsibilities and information flows, i.e.
- identify all participating agencies in terms of responsibilities for provision of resources, execution, coordination and ancillary support;
- clarify information sources, flows and reporting systems within and between participating agencies;
- examine reporting schedules by type, frequency, recipient, etc..

M&E is also considered a crucial part of the project cycle for IFSP Trincomalee (compare 1999 SLE publication on Participatory Development Concept - ANNEX 5). The need to develop a comprehensive monitoring system will become evident as soon as IFSP starts implementing projects at a larger scale. As key issues to be taken into account for the development of such a context-specific M&E system (drawing on the philosophy of the concept of participatory integrated village development approach) are mentioned:

- for projects aiming at overcoming the vulnerability of local groups M&E should incorporate the measurement of impacts on poverty reduction and improvement of food security (quantitative approach based on measurement of outputs by using suitable indicators); a computer-supported monitoring system for IFSP management (called MoRe Impact) is currently being introduced based on the LogFrame (project planning) approach; it is mainly a reporting system to administer, process and document collected project data (data of regional basis units in order to measure defined indicators for various project impact levels, namely results, purpose and goal, and to be aggregated to higher regional levels), but not a policy instrument to guide future project management;
- need to look at project implementing partners as owners of the development process responsibilities for a process-oriented participatory M&E (qualitative approach based on learning from experience rather than indicators and data collection);
- recommendation to develop a methodological M&E approach to assessing the conflict impact of project interventions (institutionalisation of a conflict impact assessment system).

5. Summary of Major IS-related Weaknesses in NEP

Based on above descriptions and discussions major IS-related weaknesses in NEP can be summarised as follows:

- ongoing characteristics of a severe crisis management in NEP hamper the systematic planning and implementation of a more comprehensive IS approach; the process of political transition with constitutional and administrative laws being subject to change and allocation of responsibilities within the government being re-defined further complicates the IS design;
- the various components of the NEP planning, budgeting and monitoring systems are not to the most possible extent harmonised and unified (horizontally and vertically); in absence of a fully integrated government machinery (institution- as well as function-wise) and in view of administrative complexity in NEP it is difficult to define boundaries of inter-related information systems and to complete such a comprehensive IS design;
- instead isolated IS activities are being initiated and implemented without an overall strategy; as consequence there is not yet an unified and harmonised conceptual and operational IS framework for institutional and data integration;
- staffing problems at the level of provincial administrative and sectoral institutions in terms of quantity and quality are obvious (assumed to exist at sub-provincial levels as well):
- no qualified IS-/IT staff is available; no employees are recruited explicitly as electronic data processing (EDP) staff;
- significant lack of statistical officers and data analysis capacities;
- current data gathering is only to a limited extent accompanied by real processing in analytical terms thus mainly fulfilling purely administrative

requirements instead of servicing purposes like planning, policy- and decision-making, management, monitoring and evaluation;

- existing abundant, not streamlined and harmonised reporting requirements to be met by various institutions at different levels with different reporting lines and formats produce data flooding / „data cemeteries“; which are difficult or unable to be shared/accessed for „productive“ purposes in terms of good governance, effective and efficient work procedures and transparency;
- newly started intensive data collection and data entry work (e.g. for building a provincial-sectoral database and regional profiles) cannot substitute for the need for systematic data bank design/structures; most data in absence of logical databank systems are kept as simple files at various locations; the data modelling for a relational databank just recently started suffers from methodological deficiencies;
- existing problems of data consistency (in terms of definitions, formats, etc.) and reliability (for lack of verification processes);
- significant uneconomic re-entering of existing data (duplication) takes place at different locations within NEP Administration (bottom-up) most probably also increasing the error rate of data entry; a fundamental improvement would come by reducing the volume of data to be captured which can be achieved by collecting a given piece of data only once and thereafter sharing it among all applications / institutions that require it (such data sharing is one of the most important characteristics of an integrated IS); currently it is not possible to reap benefits from modern database methodology and technology;
- design and application of well-conceived and unique classification, numbering and coding systems across data systems underlying relevant planning, financial programming and monitoring instruments are not yet completed;
- currently there is no data generation through automated work procedures which would feed a well-conceived databank system;
- insufficient electronic data processing and communications / networking equipment in key provincial institutions (as well as at sub-provincial level).

6. Recommendations

It is recognised that the NEP Administration cannot afford to do more IS experiments especially for political and performance reasons but should put into operation as soon as possible a functioning system as foundation for conflict resolution, good governance and transparency. The central point in further developing and installing such a comprehensive IS in an evolutionary fashion - to be based on an approved enabling framework plan - is the provincial level with institutions performing data/information-intensive activities. The IS is expected to work through existing institutional structures aiming at strengthening general public service delivery.

The Provincial Planning Secretariat as technical organisation (headed by the Deputy Chief Secretary - Planning) is responsible for carrying out provincial

planning and related functions, supporting planning activities at district and divisional levels, and interacting with line ministries, and is therefore considered to be the key actor in this IS building process - under the general guidance and supervision of the Hon. Governor and Chief Secretary. Within its mission to establish and sustain a dynamic provincial planning process the installation of a total information system and a respective database management system (taking advantage of modern technology) are of crucial importance for performing major IS-related functions as described above in Chapter 2.2.. The establishment and maintenance of well-structured and integrated provincial, district, divisional, and sectoral databases and profiles (to be build bottom-up and supported by clear guidelines) are a critical success factor in establishing the IS. Major technical partners in this process at provincial level are Local Government, Treasury, Public Administration and planning units of technical Ministries and Departments.

The major recommendations resulting from this consultancy mission are summarised below:

- official appointment of a NEP Chief Information Officer (senior management) co-ordinating and supervising all IS-related activities; this should be a person with a sound understanding of how an IS can enhance the effectiveness of NEP Administration and with the ability to comprehend the power (and limitations) of IT involved;
- establishment of an Information System / Information Technology Plan for NEP (IS/IT-Framework Plan) comprising e.g. the following steps (as far as not completed):
 - review current work and data systems;
 - carry out IS needs analysis;
 - establish an IS concept;
 - model target group-oriented databank system(s);
 - design needed internal and external data networks;
 - establish automated applications (application development);
 - specify and procure IS-related HW/SW.
- such a framework concept (which has to balance the costs of a well-designed IS against the value of the system) shall provide the basic orientation for efficient use of data/information, related technology, simplification and harmonisation of work procedures, effective data flows and storage, and optimised utilisation of institutional resources in general (see example included in ANNEX 8); the systems planning approach has to address current needs and to be flexible to accommodate expanded future needs; general approach to information system development should be that of „think big, start small“;

Technical Remark:

Effective and efficient management of data resources (functions connected with storage, updating, retrieval, and protection of the organisation's database) is one of the most critical issues in developing a successful IS. Those functions are provided by a suitable database management system (DBMS). Relationships among records (= stored data elements) are to be defined logically and physically. An IS to be expected and able to provide responses to a large variety of queries needs to deal with a large variety of links among data elements, and the

DBMS has to provide the retrieval capabilities. Standards of data element definitions (managed through the so called data dictionary) are needed for sharing data across different applications and organisational subunits. In fragmented autonomous systems this is of less importance. Data independence of the system (= separation between the database and the application programmes) increases the flexibility of an IS. Data sharing through a common database shifts emphasis from applications to data. An organisation's database needs careful protection (integrity, security, backup).

- in the context of clarifying mechanisms for data communications (vertically and horizontally among all institutions involved) networking requirements have to be determined the realisation of which to be done on the basis of standards thus avoiding "islands solutions"; based on the principle of the "smallest common denominator" such standardisation of the networking concept for core areas of NEP administration should include workstations, servers (both linked in the form of client-server architecture where needed), databanks and development systems;
- strengthen further (possibly computer-supported/automated) integration of NEP planning and implementation systems and cycles which form major objects of a comprehensive information system; the various planning cycles are to be logically and operationally linked as series of related and inter-related functions with streamlining of institutional structures and data / communications links incl. responsibilities; functional modules of such an integrated system should cover:
 - medium-term development planning;
 - investment planning and programming;
 - plan/programme implementation and progress monitoring (incl. foreign aid);
 - budgeting & accounting; financial monitoring;
 - impact monitoring
 - unification and harmonisation of classification, numbering and coding systems across all those planning and implementation systems operated at various vertical institutional levels (which is a fundamental precondition of reaping benefits from computerised data and application systems);
 - implementation of already identified/selected IS sub-modules according to current NEP priorities, but taking into account relations to the above mentioned IS/IT-Framework Plan:
- Fixed Assets management database; building steps involved would include e.g.:
 - determine and organise assets management functions and institutional responsibilities across NEP administration;
 - definition of classes and sub-classes of fixed assets with clear code numbers
 - design of records, forms and registers based on a conceptual data model
 - design the transaction processing (relevant operations) with regard to various asset categories (e.g. new procurement,

- maintenance activities, disposal, verification and updating of database, etc.)
- establish assets accounting policies (valuation, depreciation, etc.)
- carry out initial recording (verification and valuation) of assets classes
- define reporting requirements
- others
- HRD database (define steps as shown above)
- meet staffing requirements in terms of quantity and quality (statisticians, IT manager, IS maintenance, data entry etc.);
- organisation and implementation of staff qualification programmes:
- assess training needs in the field of information systems, data management, data analysis and statistics, technology, etc.;
- develop longer-term training plan with specified subject matters and staff to be qualified
- identification, proposal and selection of work procedures/business processes needed or recommended to be automated.

Major risks involved in this approach are seen with regard to the:

- overall security situation in NEP;
- problem of attracting and retaining qualified staff;
- insufficient financial resources needed to build and operate the IS.

In view of the rudimentary status of the currently existing information system and without decisions on its future design with clear organisational boundaries and inter-institutional relationships/interactions (a process which might be facilitated by means of a well-prepared workshop with all major actors involved) it is not considered meaningful to provide an estimate of resource requirements.

The review of previous and actual IS-related activities as discussed above in this report has revealed significant knowledge on the part of the NEP Administration on how to deal with basic features involved in building such a system. In view of the currently limited institutional capacities and staff capabilities, however, and of continuous financial constraints it may be advisable to look for external support in carrying out identified priority activities as soon as possible. Such support to be requested from suitable donor sources may be directed towards:

- providing local/regional/international expertise in important key areas like:
- assistance in structuring the provincial databank , especially in new / revising existent data modelling with tables design at the beginning of each databank establishment and particularly important for the success of such a project (definition of information objects/entities; modelling of tables with attributes of entities; modelling of data elements/types; definition of a primary key for each table; defining logical relations among data; optimisation of databank);
- statistical expertise (methods to deal with large data volumes, data analysis and presentation, ratios/indices/indicators, time series/trends, use of statistical software like SPSS, etc.)
- special expertise for building the Assets and Human Resources databases (draft TOR for the latter are available);

- assistance in business/activity modelling helping to understand the information flow within the organisational setting and to define who performs how which activity;
- IT expertise in networking and standards to be applied;
- assistance in reviewing/harmonising classification and coding across planning, budgeting and monitoring systems/instruments;
- expertise in finalising a comprehensive NEP-IS/IT plan;
- procurement of EDP (hardware and software like MS-SQL server as medium-sized databank technology - in case the PC system ACCESS is insufficient) and networking equipment in order to establish a fully-functioning client-server system first at the Planning Secretariat (to be linked to important data suppliers);
- as far as not covered by recruited expertise: implementation of required training measures; organisation of an information trip to suitable organisations in the region/Europe operating comparable information systems.

Annexes

- A 1 Terms of Reference
- A 2 Mission Schedule
- A 3 Workshop Paper:
Presentation and Discussion of
Findings and Recommendations
- A 4 Workshop Participants
- A 5 Documents Consulted
- A 6 NEP Administrative Structures
- A 7 Basic IT/IS Terminology
- A 8 Example:
Approach to Preparation and Stepwise
Implementation of an IS & IT Framework Plan

INTEGRATED FOOD SECURITY PROGRAMME TRINCOMALEE (IFSP) PN 97.3653.9

Brief Assessment of Conditions and Efforts to establish an Information System for the North-East Provincial Administration (Provincial Council), Sri Lanka

- Terms of Reference for Short Term Expertise -

Brief Background

The Provincial Council North-East Province in Sri Lanka is about to establish an information system (IS) for the provincial administration. The aim of this ID is to facilitate decision making at the provincial level vis-à-vis the provincial institutions, district administration and central government institutions. The Provincial Council is at present equipping its institutions with hardware and software for introducing an IS. The structure of the envisaged IS has been designed.

IS and IFSP

The Integrated Food Security Programme Trincomalee (IFSP) aims at supporting reconstruction and redevelopment in Trincomalee District for people affected by the war and suffering food deficits. To date a large number of smaller projects at village and district level have been planned and implemented. The year 2000 will see an extension of the IFSP activities. Partners for planning and implementation are the technical departments within the district administration, the district administration itself, the divisional secretaries, the technical departments at provincial level and, lately also the provincial administration and finally, NGOs and other organisations. IFSP shall establish a qualified monitoring. Here, a relation to the IS for the provincial administration is obvious. However, due to the initial stage of these activities little is envisaged yet about possible future relations.

Tasks of the Consultancy

1. Look at and understand ongoing plan for establishing IS and review vis-à-vis "state of the art".
2. Review briefly information need of provincial administration at level of Governor, Chief Secretary and Deputy Chief Secretary Planning, provincial institutions and directors, Government Agents and GA Trincomalee in particular, district administration and other users.
3. Review availability and reliability of data and information at various sources.
4. Look at reporting requirements at various levels and assess reporting formats presently used (selective checks).
5. Briefly assess efforts to establish options of the envisaged IS with respect to physical planning and performance monitoring, financial planning and monitoring and relation to physical progress etc.
6. Briefly summarise and comment the perception of the envisaged IS including the information and communication requirements of projects and donors.
7. Highlight risks.

8. Describe the envisaged IS in summary, highlight specific aspects for and effective and scheduled introduction.
9. Briefly estimate resources requirements in terms of procedures/guidelines, hardware, software and manpower development.

The consultancy is not more than a first approach towards understanding the envisaged system and to support decision makers in their efforts to communicate for broadening the base for an IS at the level of the provincial and district departments, district and divisional administration and other organisations. The consultancy should also look into the information requirements of externally funded projects and donors and implementing institutions respectively.

In the end, the consultancy should arrive at a summary view with particular details on certain subjects as they occur and reflect priorities of the decision making levels.

De-Briefing and Reporting

At the end of the consultancy a workshop shall be held to present findings and conclusions to decision makers.

A summary report of not more than 15 pages shall be submitted in two original copies according to the standard reporting requirements of IFSP at the end of the consultancy. The report shall be made available on a disk or via mail to IFSP.

Schedule

The consultancy is expected for August 2000: 10 days in Trincomalee; review and assessment of information and available material; report of max. 15 pages; presentation and workshop with selected participants at the end of the mission.

Consultant

Senior IT and/or communication specialist and/or organisation expert and/or development economist with a profound experience in analysing organisations and establishing structures; he/she must have a high capacity to interact with persons and institutions at various levels; common-sense would be a prime feature for this consultancy.

ANNEX 2

Mission Schedule

20.08. - 01.09.2000

20.08.00	Departure from Frankfurt	
21.08.00	Arrival Trincomalee Dr. Reinhard Mr. Nareth Mr. Suraj	GTZ Adviser IFSP IFSP Kampot, Cambodia (More Impact) GTZ Office, Colombo (networking)
22.08.00	Dr. Reinhard Mr. Pugendran Mr. Sivapiragasam Mr. Croos	GTZ Adviser IFSP IFSP Project Director Planning Secretariat, Project Officer Planning Secretariat, Dep. Director
23.08.00	Mr. Sivapiragasam Mr. Rangarajeh Mr. Pugendran Mr. Nareth Mr. Suraj	Planning Secretariat, Project Officer Dep. Chief Secretary, Planning IFSP Project Director IFSP Kampot, Cambodia (More Impact) GTZ Office, Colombo (networking)
24.08.00	Dr. Reinhard Mr. Rangarajeh Mr. Krishnamurthy Gen. Jayawardhana Mr. Visvalingam Mr. Sivalingam Mr. Ellango Mr. Sounthararajan Dr. Navaratram Mr. Rangarajeh & staff	GTZ Adviser IFSP Dep. Chief Secretary, Planning Chief Secretary Governor, Northern & Eastern Provinces / / / NEPC Computerisation Committee / / Planning Secretariat
25.08.00	Mr. Rangarajeh Mr. Sivapalan Mr. Krishnananthan Mr. Nadarajah Mr. Sellathura Mr. Rangarajeh & staff	Dep. Chief Secretary, Planning Dep. Chief Secretary, Finance Budget Director, Finance Secretariat Director Revenues, Finance Secretariat Director Accounting, Finance Secretariat Planning Secretariat
26./27.08.00	Mr. Nareth Mr. Suraj	Review of documents Preliminary reporting IFSP Kampot, Cambodia (More Impact) GTZ Office, Colombo (networking)

28.08.00	Mr. Rangarajeh Mr. Umakanthan Mr. Navaratnarajah Mr. Kawalanathan Mrs. Sivalingam Dr. Gnanachandran Mr. Subramania Mr. Ravi Mr. Rangarajeh & staff	Dep. Chief Secretary, Planning Planning Secretariat, Ass. Dir. Planning MoE, Dir. Planning MoE, Dir. Educat. Development MoH, Ass. Dir. Planning Provinc. Dir. of Agriculture (NEP) Provinc. Public Administr., Ass. Secretary Provinc. Public Administr., Ass. Secretary Planning Secretariat
29.08.00	8 participants Mr. Rangarajeh Ms. Singarajar	Preparation of workshop summary 1. mission workshop (Planning Secretariat) Dep. Chief Secretary, Planning IFSP-GTZ Communication Expert
30.08.00	Dr. Reinhard 12 participants	Work on draft summary report GTZ Adviser IFSP 2. mission workshop (Planning Secretariat)
31.08.00	Mr. Nareth Prof. Sivayoganathan Mr. Rangarajeh & staff Dr. Reinhard Departure for Colombo	Completion of draft summary report IFSP Kampot, Camb. (software More Impact) IFSP GTZ staff Planning Secretariat GTZ Adviser IFSP
01.09.00	Arrival Germany	

INTEGRATED FOOD SECURITY PROGRAMME TRINCOMALEE

**Strengthening of Information Resource Management (IRM) within
North-Eastern Provincial Administration**

Presentation and Discussion of Findings and Recommendations

Volker Buenning
GTZ Consultant

30-Aug-2000

1. Purpose and Implementation of Consultancy Mission

- mission within GTZ-supported IFSP Trincomalee; based on NEP request
- brief assessment of conditions and efforts to establish an IS for NEP Administration; first rough approach with 10 days in Trincomalee
 - on-going IS-planning;
 - information needs;
 - data availability and sources;
 - reporting requirements and formats;
 - IS options;
 - information requirements of projects and donors;
 - aspects of effective and scheduled IS introduction;
 - findings and conclusions;
- logical link to IFSP exists via intentions to establish monitoring system which is expected to form future component of NEP-IS (monitoring as IS module)
- German Government/GTZ has not made any financial commitments with regard to future IS-related technical assistance
- major local partners met for discussions (chronologically)

- IFSP Project Director;
- Deputy Chief Secretary - Planning;
- Chief Secretary;
- Hon. Governor;
- Deputy Chief Secretary - Finance;
- Var. (Deputy) Directors and Project Officers - Planning;
- Directors Finance (Budget; Revenues; Accounting);
- Var. Members of NEPC Computerisation Committee (Heads of Departments);
- Directors (Planning; Educ. Develop.) - Ministry of Education;
- Asst. Director Planning - Ministry of Health;
- Prov. Director of Agriculture;
- Asst. Secretaries Provincial Public Administration;

2. Conceptual and Terminological Issues

- information system can be considered as central nervous system of the organisation through which data/ information is collected, transmitted, stored, manipulated, displayed and disseminated
- question how NEP Administration can realise operational and strategic opportunities and advantages provided by a well-functioning information system (IS)
- critical success factors like quality of planning process; investment programming; implementation and monitoring systems; administrative-human resources support systems)
- structure and components/subsystems of IS have to be in conformity with structure and procedures of the organisation itself and vice versa; problem of defining systems boundaries
- term Information Resource Management (IRM) describes function that manages, organises, and coordinates data resources
an information system is a set of inter-related and interacting components (e.g. data, human resources, organisational structures, computers, telecommunications) resulting from the IRM function
- in building an IS emphasis on users of information and business needs and services; information technology is only a tool
- a successful system has to adequately deal with routine data processing tasks (routine transactions) as well as information needs of decision-makers at various levels
- a data processing scheme has to cover e.g.:

- data entry
- structure and contents of database (data organisation into different types of records with specific data elements/fields)
- database processing (efficient and effective access to the database)

3. Major IS-related Findings on Current Situation

3.1 Previous MIS-related Efforts and Activities in NEP

- efforts to build information systems in the North-East-Province go back to early 90's, examples:
 - more theoretical preparatory work 1993 on NEPIS (North-East Province Information System)
 - 1994 Computerised Divisional Level Data Base; development of MS ACCESS software package,
- various sector approaches: e.g. development of computer-based MIS for health sector

3.2 New NEP Initiative on IS and Computerisation

- Concept Outline of Secretary Planning (04/00) on NEPC-MIS, partly based on preparatory NEPIS work
- action plan for computerisation of NEP Administration since 08/2000 with focus on IS activities of technical Ministries and Departments covering following priority areas:
 - establishment of (sub-)committees
 - assigning staff exclusively for data entry
 - building sectoral database
 - building HRD data base
 - building assets database
 - development of spatial data
 - establishment of NEPC Web Site

3.3 Relevant Legal-Administrative Framework

- within the constitutional framework among others following documents describe the current NEP regulatory framework:

- Planning Procedure as of 1.1.1999
- Financial Rules North-East Provincial Council, 1993
- Operational Information 1998 (under updating)
- NEP Financial Statement (Budget)
- Annual Implementation Programme 2000 - NEP
- Divisional Annual Implementation Programme 2000 under Local Level Development Planning Process
- Others

4. Summary of Major IS-related Weaknesses in NEP

- ongoing characteristics of a transitional period and crisis management in NEP
- staffing problems in terms of quantity and quality:
 - no qualified IS-/IT staff available
 - lack of statistical officers and data analysis capacities
- abundant, not streamlined and harmonised reporting requirements with different reporting lines and formats produce „data cemeteries“
- significant re-entering of existing data (duplication)
- components of the NEP planning, budgeting and monitoring system are not harmonised and unified (horizontally and vertically);
- difficult to define boundaries of inter-related information systems and to complete a comprehensive MIS design
- effective classification, numbering and coding systems across relevant planning, financial programming and monitoring instruments are not yet completed
- no data generation through automated work procedures
- data collection and data entry work cannot substitute for the need for systematic data bank design/structures; most data kept as simple files in absence of logical databank systems at various locations
- problem of data consistency and reliability

5. Recommendations

- official appointment of NEP Chief Information Officer (senior management)
- establishment of an Information System/Information Technology Plan for NEP (IS/IT-Framework Plan) for current and future needs
 - review of current work and data systems
 - carry out IS needs analysis
 - establish an IS concept
 - model target group-oriented databank system(s)
 - design needed internal and external data networks
 - establish automated applications (application development)
 - specify and procure MIS-related HW/SW

general approach to information system development: „think big, start small“;

- further (possibly computer-supported/automated) integration of NEP planning and implementation systems and cycles
 - functional modules cover:
 - development planning
 - investment planning
 - plan/programme implementation and progress monitoring
 - budgeting & accounting; financial monitoring
 - impact monitoring
- unification and harmonisation of classification, numbering and coding systems
- implementation of identified/selected IS sub-modules according to current NEP priorities:
 - Fixed Assets management database
 - HRD database (define steps as shown above)
- organisation and implementation of staff qualification programmes
 - assess training needs (information systems, data management, data analysis and statistics, technology, etc)
 - develop annual training plan with specified subject matters and staff to be qualified
- identification, proposal and selection of work procedures/business processes needed or recommended to be automated
-

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 Part C: Foreign Aid Guidelines

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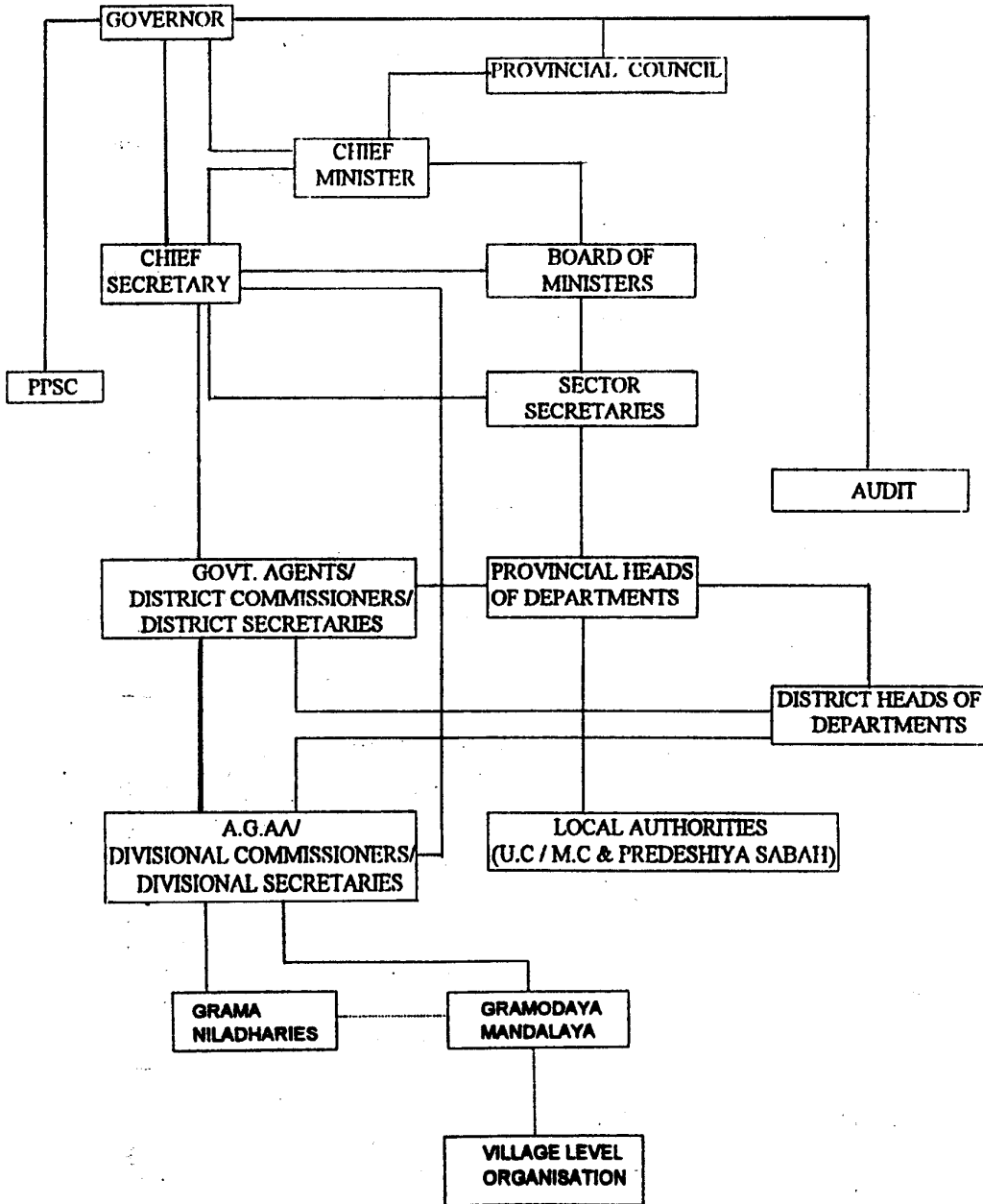
SLE Centre for Advanced Training in Rural Development, Food Security and Conflict - A Participatory Development Concept for the Integrated Food Security Programme Trincomalee, Sri Lanka , Berlin 1999

Various NEP Administration correspondence, circulars etc.

NEP Administrative Structures

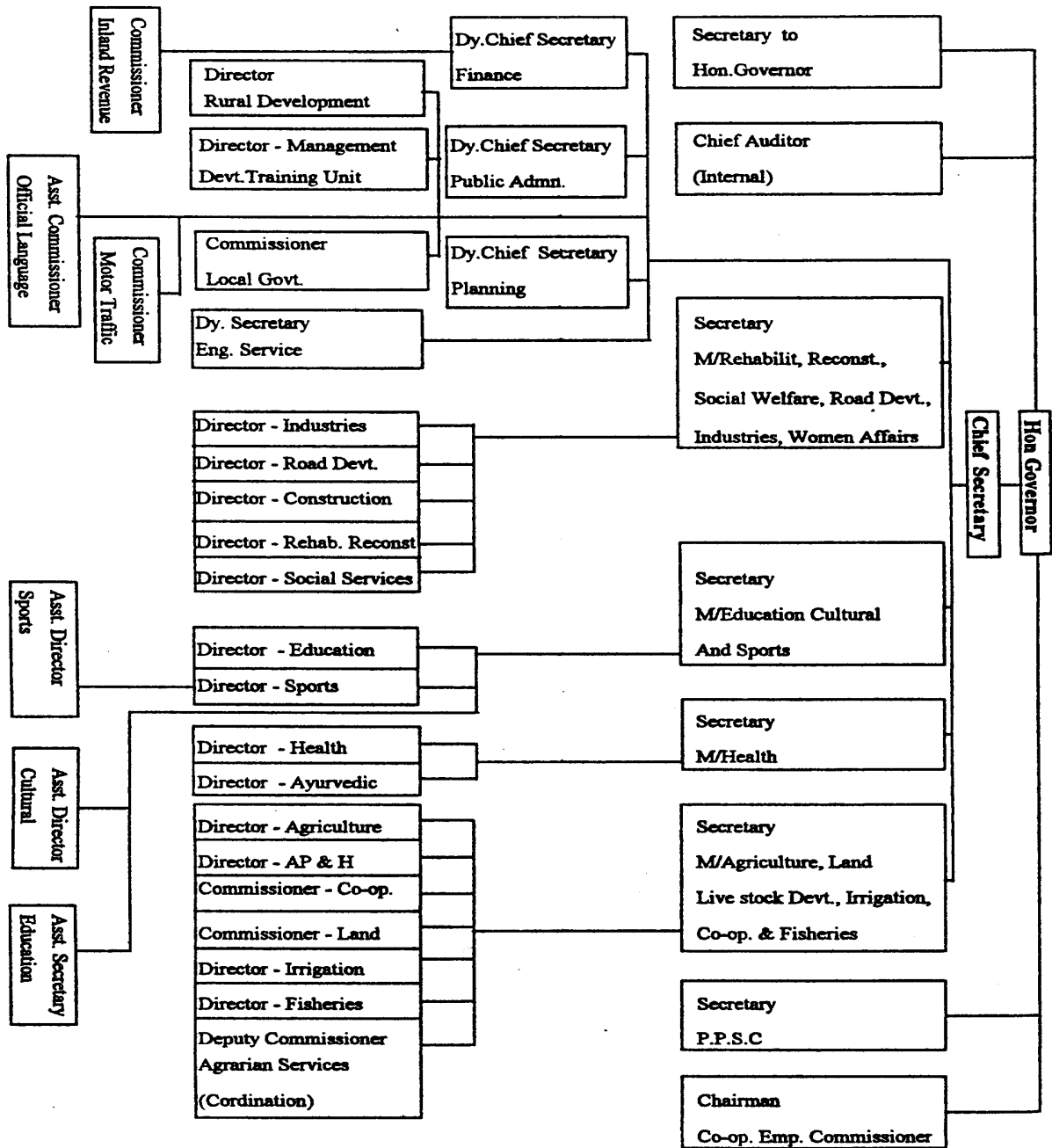
Source: Planning Secretariat NEPC, Operational Information 1998

ADMINISTRATIVE STRUCTURE OF THE NORTH-EAST PROVINCE

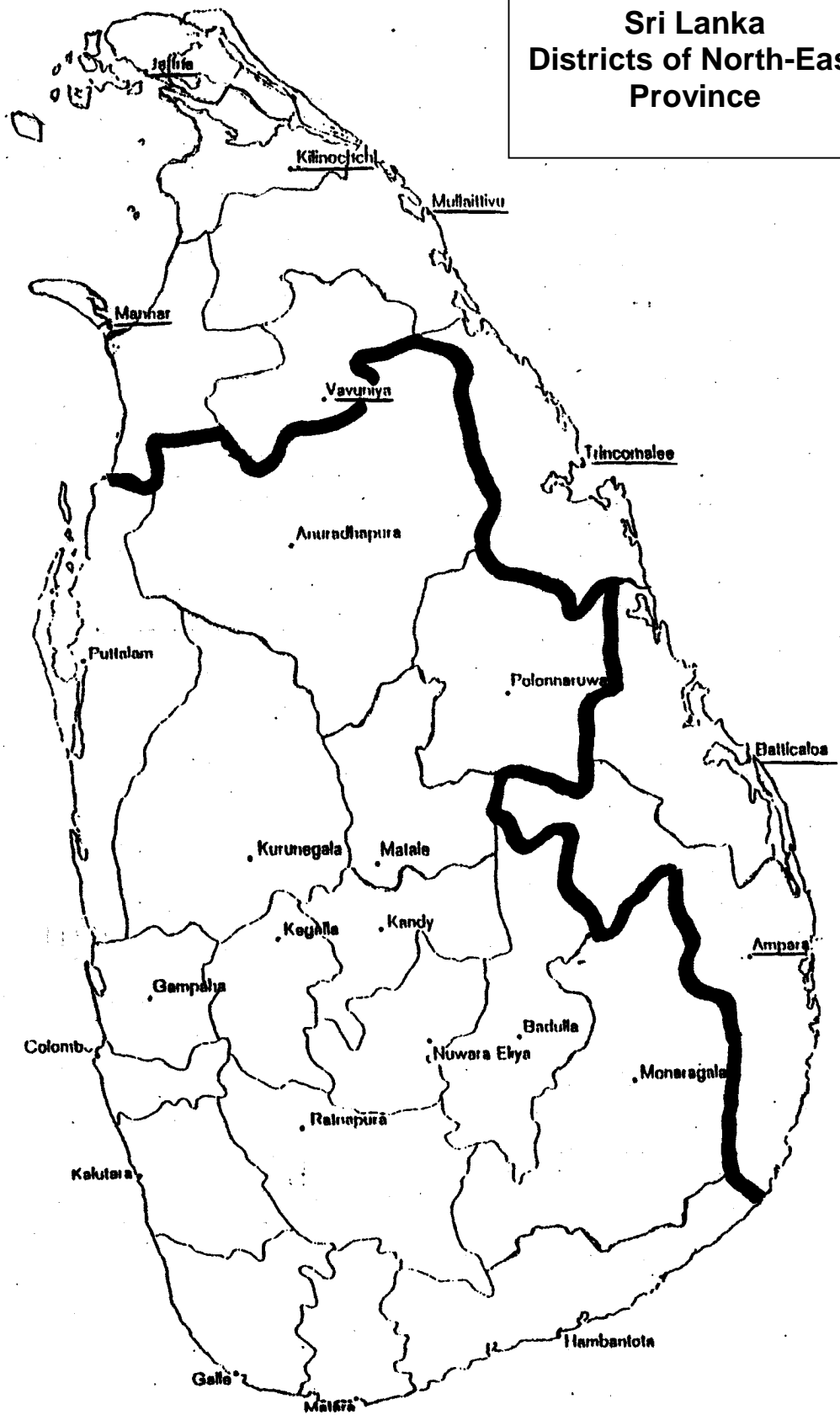


ORGANIZATION CHART

ORGANIZATION CHART



**Sri Lanka
Districts of North-East
Province**



Basic Terminology

- data:
numeric values, textual or image characters entering the IS (often as so called transaction data from routine operational matters like licensing or registration); it is generally retained in the institutional database in raw form prior to processing into information)
- database:
collection of machine-readable data maintained as part of an IS (and described by the system's data dictionary)
- database management system (DBMS):
system software providing a variety of functions needed e.g. to access, maintain/update, and protect an organisation's database
- data dictionary:
central repository of information about elements in data and process models, it contains the definition of each element
- data flow:
an element of a process model; a data flow represents information entering into or exiting from a process
- data model:
a diagram describing the organisation's data and how different pieces of data are interrelated; a variety of techniques are available to produce data models (e.g. Entity-Relationship Model)
- entity:
an element of a data model representing a category of object that is of interest to the organisation and about which data will be maintained (e.g. employee); attributes are used to specify characteristics of entities (e.g. name of employee, birth date, cadre position etc.); a relationship is an association between/among entities
- information:
processed data used for decision-making (derived from raw data with the purpose of making it available for decision-making)
- management information system (MIS):
computer-based information system used in the operational management as well as in decision-making of an organisation
- MIS plan:

plan for developing and operating an organisation's MIS including a time-phased estimate of the functions to be provided and the resources required

- needs analysis:

assessment of information and functional needs of an organisation as a first step in defining the specifications for an information system

- office information system:

information system that provides a set of capabilities to support typical office functions like text production, communications, document storage and retrieval etc.

- system analysis:

translation of functional needs of an information system into a set of detailed program specifications

- system architecture:

basic form of a computer system and relationships between its components; network architecture involves the definition of both local area networks (LAN) and remote telecommunications lines;

preparation of systems architectures is based on requirements defined through information models; the five major categories of data processing technologies are: data - applications - systems software - hardware - networking

Example:

Approach to Preparation and Stepwise Implementation of an IS & IT Framework Plan

In designing and specifying the use of information systems - in order to exploit the potential of data and information processing - one has not only to rely on technicians but mainly to involve the various management levels across the organisation. Sound understanding of the organisation's relevant tasks and business needs and looking at problems from the perspective of users of information are important prerequisites for this exercise. Participants involved in the development and use of IS have to know and understand the managerial aspects of the process such as principal functional activities within the organisation and its sub-units, organisational structures, reporting, planning, monitoring and control system etc.

- 1. Document and review current work and data systems** (clarify information flows and reporting structures)
 - A. collect documents/materials on organisation and its work environment (as far as available in writing):
 - organisational structure and functions
 - staffing situation
 - job descriptions
 - laws, rules and regulations to be applied/observed
 - internal work instructions
 - forms used in daily work
 - B. provide summary description of fields of work
 - C. describe existing reporting plans (if possible by post or organisational unit) covering:
 - subject matters
 - sender/receiver(s)
 - format used
 - timing
 - D. document information and communication technologies and methods currently in use:
 - hardware available
 - software used
 - word processing
 - spreadsheets
 - data bank systems
 - graphics
 - other applications
 - use of programming languages

- communications systems
- office organisation (filing system, registration and coding, renewed submission system, archiving)
- E. describe flow of information between organisation's internal & external sources on the one hand and users on the other hand by defining separate data cycles with clear sources and results:
 - data collection
 - data source
 - contact person(s)
 - frequency
 - contents
 - forms used
 - problems
 - data entry and storage
 - responsibility
 - entry type (e.g. manual lists, card system, PC)
 - frequency
 - topicality
 - problems
 - data processing
 - data source
 - responsibility
 - procedures/steps
 - frequency
 - results
 - tools used
 - problems
 - results
 - kind of results (tables, statistics, others)
 - receiver of information
 - frequency (daily, weekly, monthly etc)
 - cause (periodical, specific date, at request, special event etc)
 - missing information
 - useless information
 - problems
- F. assess current deficiencies (in terms of promptness, accuracy, relevance, missing information, delays, etc)
- 2. **Carry out IS needs analysis** (analysis of documents, interviews, questionnaires, observations etc.)
- A. determine IS requirements and specifications at various levels with regard to
 - flow of information (necessary, desirable)
 - data sources (relevance, actuality, accuracy, availability)
 - data processing (incl. forwarding, reporting, data checking; rules / instructions to be applied)
 - results (description)
 - other requirements (organisation, documentation and filing, etc)
 - undertake cost-benefit considerations

- B. more detailed checklist:
1. analysis of work procedures in terms of technical steps, time, parties involved, information/programmes/forms/equipment used
 - who to whom
 - what
 - how
 - when
 - for which purpose
 2. data analysis (origin, use, quantities, qualities)
 - where originate which data from
 - who records which data
 - who processes which data
 - who uses which data in which way
 - who receives data processing results for which purpose
3. **Establish an IS concept** in close communication and coordination between all parties involved
- reach consensus on MIS objectives and expectations of parties concerned (by different user groups - top / down - and IS functions like reporting, management of documents, spreadsheets & graphics, simulation, modelling and forecasting etc.)
 - establish technical concept based on identified information needs
 - develop implementation concept and determine priorities for stepwise realisation
 - define MIS product requirements (from different points of view like user, developer, information manager)
 - develop suitable IS architecture
 - hardware (workstations, PC networks)
 - data storage system (data centralisation/distribution, data modelling)
 - application architecture (modules and functions of IS)
 - communications
 - collect information on information technology standards (to be) applied in the country (general IT recommendations and standards)
 - collect and analyse information on other relevant current and planned information system and automation approaches incl. use of information and communication technology
 - prepare detailed implementation plans for priority areas of concern, e.g. Human Resource System
4. **Propose and select work procedures to be automated**
- justify proposal to automate proposed business process
 - Automate identified procedures
- A analyse and review current manual systems for proposed process
- B recommend improvements in execution of these business processes before automating existing practices
- C computerise these functions (application development)

develop the technical concepts for both processes based on user requirements
make detailed systems designs incl. data structuring/organisation and programme specifications
programming / prototyping (adaptation of suitable standard software package, e.g. ACCESS)
testing and introduction

D enter and check historical data

5. Develop target group-oriented databank system(s)

(closely linked to application development)

A draft effective and efficient system for data resources (functions connected with storage, updating, retrieval, and protection of database)

logical databank design (logical data structures and links)

physical data organisation/storage

user interface (user access through application programmes)

B define information demands and provision of data for the system

internal data (e.g. direct from operative applications)

external data (e.g. through access to online databanks)

C analyse practicability of distributed / decentralised data bases within organisation

D establish criteria for selecting suitable (relational) database management system (DBMS)

E select and install DBMS

F define and clarify (centralised vs. decentralised) responsibilities for information management (operative and strategic levels incl. distribution of data processing resources)

6. Develop internal and external data networks

A make functional network planning

which functions/applications and data at which work places

networking of which workplaces for which purposes

access from which work places to which wide area nets

B specify hardware platform design and distribution of hardware components, data and applications; client-server solutions recommended

C study various technological alternatives for network design (e.g. with regard to communication capacity, network topology, communications standards)

D design and install internet-capable local area network(s)

determine technical LAN-components (e.g. cabling, distributors and

communications equipment, network cards, operating system,

allocation of functions between clients and servers, protection

measures)

E prepare for and realise Internet access

F develop website and determine preliminary Internet information offers (homepage); transfer data online to an Internet environment

- 7. Establish automated applications (application development)**
- A make use of conventional stages in software development (software engineering):
- initial screening/justification (broad & quick screening of potential applications/proposals);
 - needs analysis to determine desirable functions and outputs of proposed application along with technical specifications;
 - system design (preparation of detailed technical description of system that provides specified functional capabilities, and data modelling);
 - programming (production of executable computer program that achieves the specified functions and characteristics); use of purchased application packages is recommended;
 - testing;
 - deployment;
 - operation, maintenance, adaptation.
- 8. Specify and procure MIS-related HW/SW**
- A prepare preliminary outline/specifications for IT equipment and networks needed in the medium-term
- B procure and install most needed hw/sw and communication tools in line with masterplan, selected MIS architecture and applications development
- 9. Qualify staff**
- A assess training needs in the field of information systems, technology, and management
- B develop annual training plan with specified subject matters and staff to be qualified
- C collect and analyse information on relevant IS- and IT-related training opportunities
- D provide training according to plan