

APPENDICES

**with the advice for terms of reference for
environmental profile of Shabwah Governorate,
Republic of Yemen**


(Appendices 1 to 8)

APPENDIX 1

Letter of DGIS dated January 12th 1994, in which the Commission is asked to submit an advisory report

Ministerie van Buitenlandse Zaken

Bezuidenhoutseweg 67
Postbus 20061
2500 EB 's-Gravenhage
Telefoon 070 - 3 48 64 86
Telex 31326

	Commissie voor de m.e.r. OS
ingekomen:	17.01.94
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dossier:	004-1
kopie naar:	Sc/Mo / Han / kol Po / Pres BieB

Commissie voor de milieu-effect rapportage
t.a.v. de heer Drs. J.J. Scholten
Postbus 2345
3500 GH Utrecht

Directoraat-Generaal
Internationale Samenwerking

Datum: 12/1/94

Onderwerp: ToR milieuprofiel
Shabwah-gouvernoraat
WW/92/850 vlgnr. 6
(MER/94/006)

Kenmerk: DDI-DST
ML/94/11

Ik moge u verzoeken een ToR op te stellen voor een milieu-profiel van de Shabwah-regio, zoals door u voorgesteld tijdens de debriefing over het rapport "Advice on the specifications for the content of the EIS on the water supply, sanitation and waste water disposal projects for Ataq, Wadi Jirdan, Nisab and Beihan areas, Shabwah Governorate, Republic of Yemen, october 1993".

Belangrijke overweging voor mijn verzoek is ook verdere methode-ontwikkeling t.a.v. van het milieu-(toetsings)-instrumentarium. Milieu-effectrapportage ondervindt dikwijls een gebrek aan gegevens om tot een adequate risico-evaluatie te kunnen komen, de cumulatieve effecten van ontwikkelings-activiteiten nog daargelaten. Uitvoering van mijn verzoek kan tot een beter inzicht terzake bijdragen.

Enerzijds levert bovengenoemde activiteit dus een ToR voor het Shabwah-milieuprofiel op; anderzijds levert het een, naar dezerzijds wordt aangenomen, welkome bijdrage aan de ontwikkeling van het milieu-instrumentarium van het DGIS. Zoals u bekend, is de huidige standaard-ToR voor milieuprofielen opgenomen in de Explanatory Notes bij de O-toets. Deze is gebaseerd op het OECD-document: Guidelines on Environment and Aid No. 2 - Country Environmental Surveys and Strategies. Beide documenten zijn in uw bezit.

Het verslag van een discussiedag over milieuprofielen, die najaar 1992 op het departement gehouden is, treft u als bijlage aan.

Ik ga er van uit dat (gedeeltelijk) dezelfde werkgroep als voor het opstellen van de MER-richtlijn voor Shabwah, eventueel aangevuld met andere deskundigen, zich van deze taak zal kwijten en zie gaarne uw suggesties voor een werkgroepsamenstelling en begroting tegemoet. De bepalingen als vervat in de overeenkomst tussen het DGIS en de Commissie voor de m.e.r. dd 24 maart 1993 zijn onverkort van toepassing.

DE MINISTER VOOR ONTWIKKELINGSSAMENWERKING,
Voor de Minister,

Hoofd Milieuprogramma ²

Mr. W. A. Schlingemann

APPENDIX 2

Project information

Proposed Activity: The preparation of a profile for Shabwah governorate, Republic of Yemen

Categories: Environmental profile, Development profile

Project numbers: WW/92/850 vlgnr. 6 (MER/94/006) Cie.m.e.r. 004

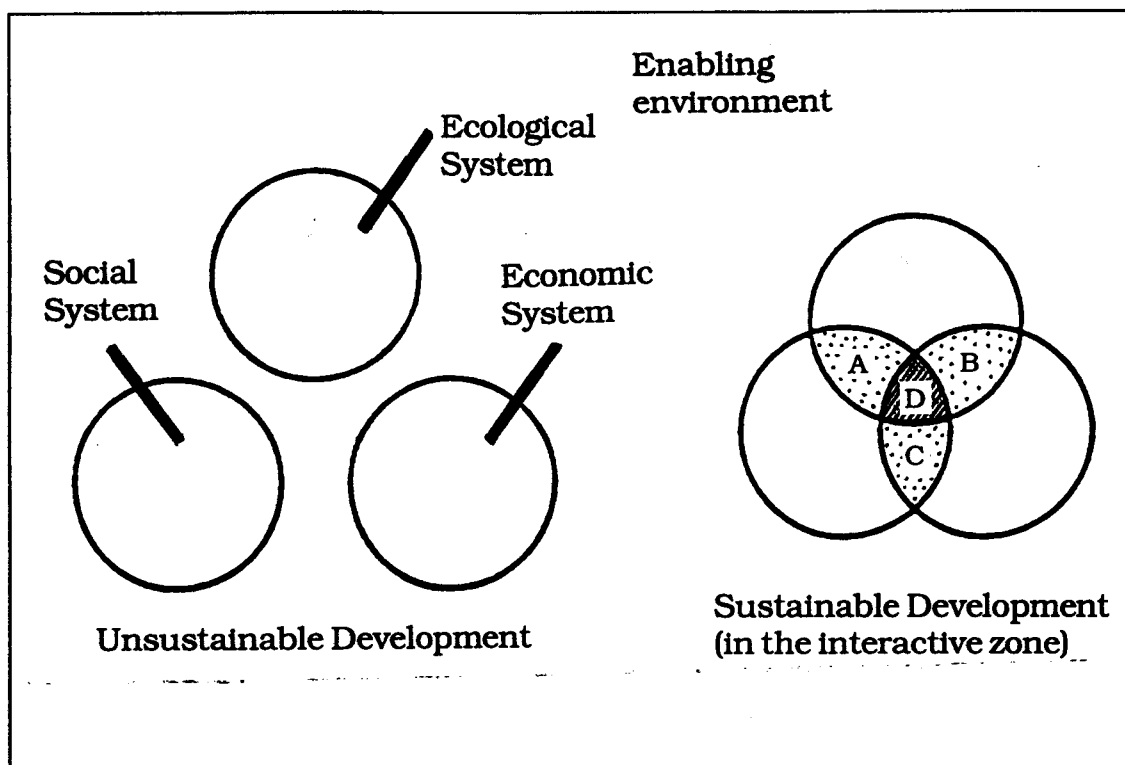
Composition of the working group of the Commission for EIA:

- Mr H. Al-Gunied, (Yemeni expert);
- Mr M.S. Al-Aroosi (Yemeni expert);
- Ms E. Bosch;
- Mr H.Th.J. Chabot;
- Mr J.J. Kessler;
- Mr H. Nieuwenhuis;
- Mr D. de Zeeuw (Chairman).

Technical secretary: Mr A.J. Kolhoff

APPENDIX 4

The sustainable development system



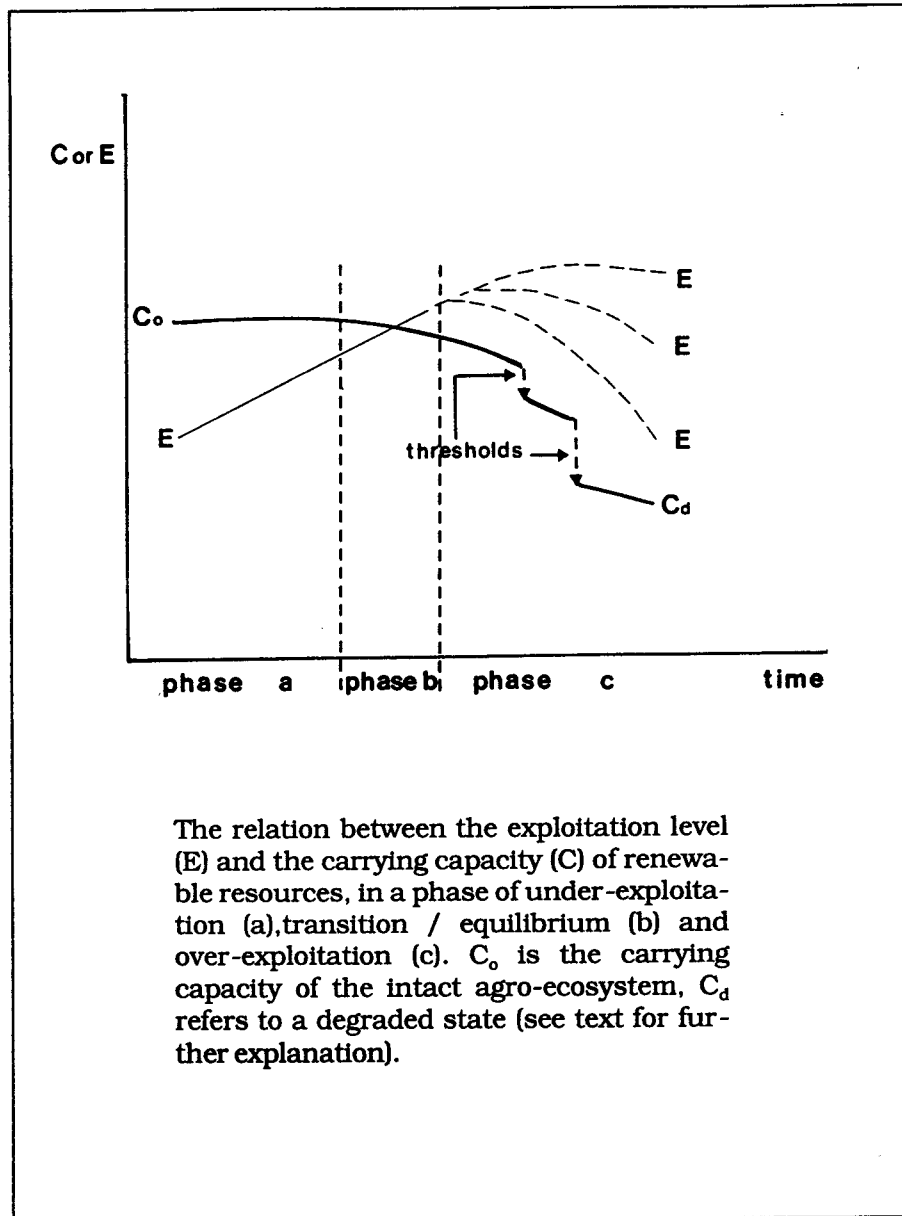
INTERFACE	EXAMPLES OF ANALYTICAL TOOLS	EXAMPLES OF PLANNING PROCESSES
A	Traditional EIA	National Conservation Strategies Sectoral Natural Resource Strategies
B	Social Cost Benefit Analysis	Traditional Development Plans
C	Some Human Ecology & Anthropology Studies	UNESCO Man and the Biosphere Programme
D	Sustainability Analysis (modified EIA)	National Sustainable Development Plans/Strategies

Note: This diagram is illustrative only and is not intended to imply that all EIA and SCBA studies are narrowly focussed. Whilst current EIA approaches are focussed primarily at the interface between the environmental and economic systems (eg, the impact of enterprises on habitat), it is recognised that other forms of EIA have incorporated some social dimensions.

Source: Dalal-Clayton, 1992 & OECD/DAC, 1994

APPENDIX 5

Carrying capacity, under- and over-exploitations



Source: Kessler, 1994

Explanation to the figure

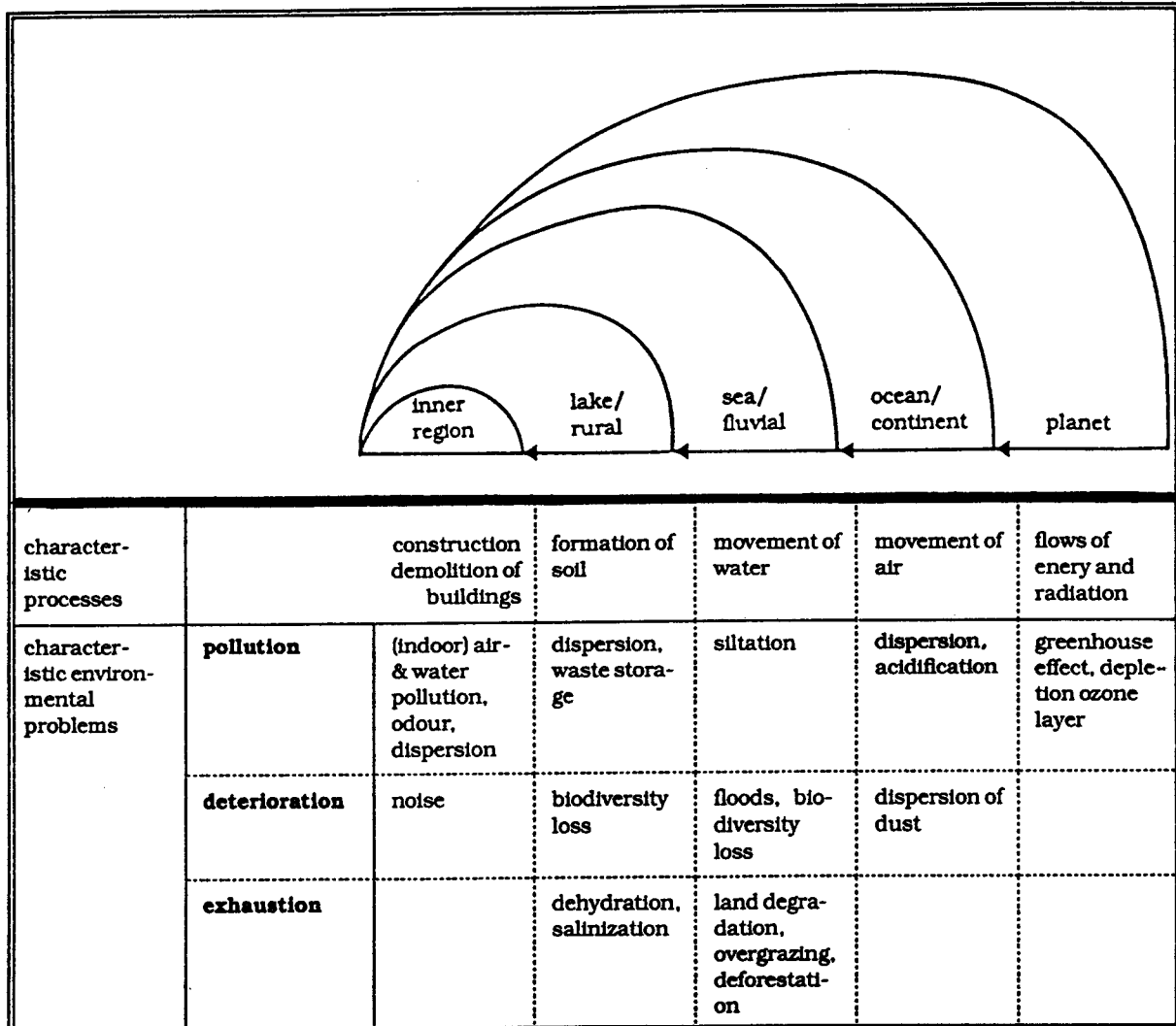
The carrying capacity concept was developed for rangeland management in order to assess sustainable livestock stocking rates. Plant production is determined by the production resource of which the availability is most limiting (Liebig principle), which is usually water or nutrients. Therefore, the carrying capacity is actually the production capacity of one specific, most limiting, natural resource (= "milieu gebruiksruimte" for resource x). Early applications of carrying capacity concepts to agricultural land-use have been much criticised, since carrying capacity was usually expressed by population densities as part of top-down policies.

The newly proposed definition of human carrying capacity is: "the maximum level of exploitation of a renewable resource imposing limits on a specific type of land-use, that can be sustained without causing irreversible land degradation within a given area." Hence, the carrying capacity is a property of the ecosystem. The definition is primarily aimed at maintaining ecosystem productivity and resilience, i.e. avoiding irreversible land degradation. The human carrying capacity is based on the sustainable supply of natural resources and on resilience thresholds of the ecosystem. The level of maximum sustained exploitation of natural resources can also be expressed as maximum sustainable agricultural production levels, or sustainable population densities based on such production levels. However, such expressions and applications require careful definitions of assumptions and conditions involved.

The level of carrying capacity (the sustainable supply of natural resources and the associated resilience) is very difficult to determine. Therefore, absolute assessments of human carrying capacity have limited value only, particularly in semi-arid regions. On the other hand, comparing human carrying capacity levels with current exploitation rates of natural resources provides a useful starting point for strategic planning, and for consideration of the ecological aspects of sustainable land-use. This is indicated in the figure. As exploitation levels increase and reach the level of the carrying capacity, an equilibrium is reached. However, it can also be a phase of transition to over-exploitation. The resource base will degrade if exploitation levels greatly exceed the carrying capacity. As a result, (land) degradation occurs; where populations greatly depend on the natural resources for their survival, exploitation levels will have to decrease as the resource degrades. This is indicated in the figure. Among experienced development workers and residents there is usually consensus about which of the three phases in the figure is applicable to a given region. Such best professional (including indigenous) judgements are mainly based on field indicators.

APPENDIX 6

Spatial scales of environmental problems



Source: RIVM, 1989

Division of environmental problems into three main categories

Pollution (chemical, physical and biological); affection of regulation functions;

Deterioration (disturbance and spatial occupation); affection of the information- and regulation functions directly and the production functions indirectly;

Exhaustion (renewable abiotic and biotic resources and non-renewable resources and energy suppliers); affection of production functions by over-exploitation of the natural production capacity (carrying capacity) of the environment.

Explanation to the figure

Spatial scales of environmental problems

An analyses of the nature of the cycles shows that five levels can be distinguished with characteristic material and energy flows occur. These are the local, regional, fluvial, continental and global levels.

The **local level** comprises the built environment within which men spends a large part of his time. Here the characteristic problems are: disturbance by stench and noise, occupational pollution, water- and air (pollution in town centres especially) and indoor pollution.

On a **regional scale**, the slow material flow in soil and groundwater is the determinative factor. problems arising from the accumulation of nutrients and persistent substances such as phosphate, nitrate, heavy metals and pesticides are of particular importance in the very regions where they are being introduced into the environment (over-fertilization and dispersion), because of the very low transport rates. As a result of the extraction of water, the hydrological cycle is also affected on this scale. The disposal of waste, by dumping it legally or otherwise, leads to a threat to soil and groundwater.

On a **fluvial scale**, transport via surface water is the carrier of two kinds of problems for the riverbasins and the contiguous epicontinental seas. The first stems from the systematic loading of the water with persistent substances. these also include occasional discharges of very toxic substances. The other problems concern the supply of nutrients to the surface water, whereby aquatic ecosystems are damaged. Both types of problems can lead to the accumulation of substance in the waterbottoms.

On a **continental scale**, the circulation of air in the boundary layer (at an altitude of 0-3 km) is decisive for the dispersion of substances from within a few days to several weeks at most. It concerns aerosols, photo-oxidants, acidifying substances and radionuclides. The actual problems need not arise in the atmosphere itself but can also, as in the case with acidification, occur in the soil or water.

On the **global scale**, the circulation in the higher layers of the atmosphere leads worldwide to the mixing of additions to the atmosphere within one to two years. A host of substances with a lifetime of several years or longer is currently accumulating in the upper atmosphere. Greenhouse gases and ozone destroying substances are active on a global scale (climate change, depletion of the ozone layer).

The time factor plays a part in the development of environmental problems. When substances build up in reservoirs it can take a long time before an environmental problem becomes apparent and often even longer before the problem has been solved once the emission has ceased or the pressure decreased. In many instances there is also a limited buffer capacity of reservoirs, which is finite. Only when the buffer capacity has been exceeded will the environmental problem manifest itself. These mechanisms are called 'roll off mechanisms'.

APPENDIX 7

Interrelations of the sustainable development system

Characteristics of the key-factors (indicated in the figure on page 'iii' of this appendix)

Population

- density, structure;
- growth rate (determined by: birth rate, mortality, immigration, emigration);
- sex ratio;
- % female headed households.

Local level institutions and organisations

- ethnic groups, their interactions (complementarity, competition, taboos);
- religious groups, their interactions (see above);
- social organisation: community organisations, professional organisations etcetera;
- gender aspects;
- local legislation, land tenure, inheritance rights, usufruct rights etc. (both traditional and modern).
- budgets (local/national, taxes/contributions).

Regional (governorate) level institutions and organisations

- legislation, land tenure, usufruct rights etcetera;
- available government services, their capacities, services offered, staffing;
- budgets (local/national, taxes/contributions).

Needs

- food, housing, firewood, water, arable land etc. (in relation to the natural resources: see page 8 of the advice);
- differences in relation to gender or ethnic group.

Nutrition

- calorie intake, mineral deficiency;
- growth rate;
- differences in relation to gender or ethnic group.

Health

- life expectation, (child) mortality rates;
- illnesses;
- health services offered in relation to population (doctors, nurses, hospital beds);
- differences in relation to gender or ethnic group;
- causes of death.

Education

- literacy rate, years primary education;
- available education services;
- differences in relation to gender or ethnic group;
- % vocational training.

Housing/sanitation

- housing quality, indoor air quality;
- water availability for drinking, washing etcetera;
- garbage disposal, systems available and used;
- access to electricity;
- differences in relation to gender or ethnic group;
- waste water disposal and treatment.

Labour

- division by age / gender / ethnic group;
- availability (seasonal, annual);
- quality (experience, qualifications);
- salaries (for different categories of expertise).

Capital

- income per capita;
- income distribution / equity / gender aspects;
- income generated inside / outside province.

Production per sector

- agriculture: % cereals, % cash crops, % home-consumption, importance livestock sector, product diversification, production levels and annual variation, technology used;
- forestry: use of firewood, construction wood;
- importance of fishing, hunting, tourism;
- industries: diversification;
- services: remittances, trade, banking etcetera;
- in the above sectors indication of employment, salaries, differences in relation to gender or ethnic group.

Technology

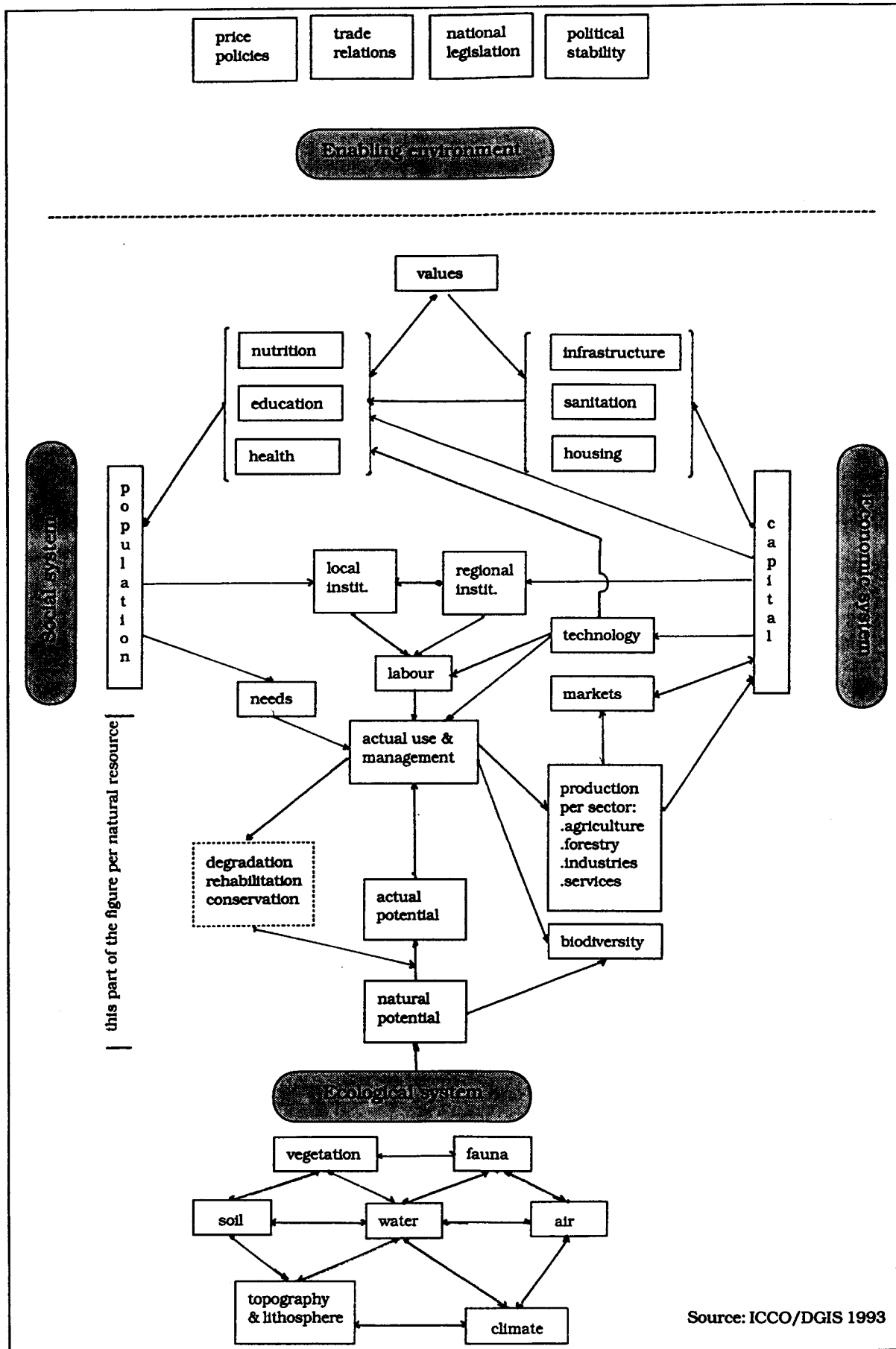
- use of external inputs (availability of fertiliser, pesticides, oil/petrol, improved seeds);
- maintenance of equipment, available services;
- level of technology, expertise/training required.

Markets

- cash flow, internal / external flows;
- market demands, continuity, variability;
- price relations (between agricultural products and industrial products);
- price policies: subsidies, tariff walls;
- density and location, urban or rural;
- relation imports / exports;
- availability of external inputs (see above).

Infrastructure

- degree of electrification;
- roads network / airlines / etcetera;
- public transport facilities and costs;
- telephone.



Source: ICCO/DGIS 1993

APPENDIX 8

Checklist for the execution of the first, second and fifth step

This is preliminary not exhaustive checklist for the execution of a potential and sectoral analysis as part of respectively the first, second and fifth step. In this list a distinction is made between (i) the productive sectors, (ii) the supportive sectors and (iii) the enabling environment. For the productive sectors the following categories are distinguished:

- present potential limited by natural resources and;
- present potential limited by socio-economic conditions;
- trends (autonomous development).

For the supportive sectors are distinguished:

- present situation;
- trends.

The enabling environment is not divided into categories.

For determining the potential and trends it is necessary to make use of indicators. Indicators are marked with an asterisk (*).

1. Productive sectors

1.1 Agriculture

Present potential limited by natural resources

- water:
 - originating from rainfall: rainfall quantities and distribution, recent changes in climate? (rainfall patterns last 30 years), water harvesting measures, floods;
 - originating from groundwater: aquifers, number of wells;
- temperature (winter frosts);
- soil fertility and land degradation (e.g. salinization, flooding, soil depletion, wind erosion, water erosion);
- pests/diseases;
 - * crop selection and crop yields, signs of poor crop condition;
 - * sign of erosion;
 - * lowering of ground water table;
 - * organic matter and nutrient contents of the soil;
 - * frost and pest damage (both insects and parasitic plants, some parasitic plants are indicators for poor soil conditions);
 - * % of the alluvial irrigated wadi soils;
 - * abandoning of terraces.

Present potential limited by socio-economic conditions

- labour availability and -division;
- level of organisation (in order to maintain terraces, water harvesting structures, water use legislation);
- agricultural techniques: present techniques are probably highly efficient with respect to the use of natural resources (but require high labour inputs and a high level of organisation), but may be improved when other resources become available (irrigation, fertilizers);

- rural poverty (providing bottlenecks for required investments for agricultural intensification);
- potentials for marketing of cash crops and their profitability;
 - * labour efficiency;
 - * emigration rate of men, and the proportion of female headed households;
 - * investments in the agricultural sector / the application of "new" agricultural technologies;
 - * price relations between agricultural sector / the application of "new" agricultural technologies;
 - * general indicators for rural poverty.

Trends

- increasing dependence on groundwater for crop production;
- decreasing economic potential for investments?
- change in labour availability for rural activities due to emigration / immigration?
- increasing growing of cash crops for export;
- shift in the proportion of tree crops;
- change in maintenance of terrace land;
 - * export of agricultural crops;
 - * erosion from terraced slopes: flooding in valleys, siltation downstream etc.

1.2 Livestock / rangeland management (usually, but not always as part of farming systems)

Present potential limited by natural resources

- drinking water (during the dry season mainly);
- forage availability (grazing capacity in relation to stocking rate);
- free grazing rangeland production (rainfed);
- cultivated fodder (usually irrigated);
- plant / animal diseases;
 - * rangeland condition: signs of land degradation (soil erosion, bare soils) and indicator (palatable) plants that disappear when the land is overgrazed, whereas unpalatable species appear (e.g. *Calotropis procera*);
 - * animal productivity;
 - * presence of animal diseases;
 - * proportion of animal feeds imported.

Present potential limited by socio-economic conditions

- legislative aspects (grazing rights);
- livestock herd management (composition of the animal population, herder identity);
- potentials for marketing of livestock products/demand for livestock products;
 - * existence and management of traditional grazing reserves;
 - * price relations between livestock products and agricultural crops;
 - * herding patterns.

Trends

- increasing livestock productivity
- increasing livestock numbers / increasing proportion of goats?
- increasing occupation by arable cropping?
- increasing dependence on irrigated fodder crops?
 - * the ratio between rangeland area and cropland;
 - * feeding strategies and composition of forage intakes.

1.3 Fisheries

Present potential limited by natural resources

- fish reproduction capacity (carrying capacity) in relation to exploitation rate (overfishing);
- marine pollution (waste, oil-spills);
 - * proportion of small (young) fish in population;
 - * fish deaths due to pollution.

Present potential limited by socio-economic resources

- inefficient fishing, lack of fishing techniques and lack of skills;
- lack of control/enforcement of fishing;
- poor marketing and transport facilities;
 - * fish consumption and export.

Trends

- increasing overfishing?
- increasing large scale technologies for fishing?
- increasing pollution?

1.4 Forestry (there is no forestry in the strict sense of the word, energy demands are integrated with farmers practising agriculture and livestock husbandry)

Present potential limited by natural resources

- tree growth in relation to exploitation rates;
- natural conditions limiting the potential for tree establishment (shallow soils, frost prolonged dry season, sandiness of soils);
 - * presence of young, regenerating trees;
 - * woody cover and species composition;
 - * woody species cut for firewood.

Present potential limited by socio-economic conditions

- energy demands at household level;
- rural poverty;
- poor gas supply/no alternatives for wood as energy (rural areas mainly);
- lack of legislation to control wood cutting;
 - * proportion of households using wood as energy source, in relation to other energy sources;
 - * proportion of households depending largely on wood sales.

Trends

- increasing / decreasing deforestation;
- increasing use of other energy sources, mainly in urban areas, decreasing energy loss due to efficiency improvement;
- tree planting by households (e.g. fruit trees).

1.5 Nature

Present potential limited by natural conditions

- lack of short term economic profits from nature;
 - * contribution of the area to biodiversity (endemic species).

Present potential limited by socio-economic conditions

- lack of knowledge on medical and genetic potential of natural fauna and flora elements;
- lack of environmental awareness;
- absence of a policy to make nature aspects profitable.

Trends

- largely unknown; is there a growing awareness among populations?
- deterioration of water-related nature (areas where vegetation is related to shallow groundwater, e.g. perennial streams and maybe open-water availability for fauna);
- increasing pressure on areas with high natural value (reduction of area in wadis?).

1.6 Industries (differentiate for urban/rural areas, informal/formal activities and on farm (women)/off farm activities)

Present potential limited by natural conditions

- water aquifer depletion, pollution (EIA).

Present potential limited by socio-economic conditions

- purchasing power (enterprises);
- marketing of goods (infrastructure).

Trend

- urban booming.

1.7 Tourism

Present potential limited by natural conditions

-

Present potential limited by socio-economic conditions

- access to historical/archaeological sites;
- number of overnight facilities.

Trends

- increasing number of foreign tourists.

2. Supportive sectors

2.1 Education

Present situation

- rate of illiteracy, gender specific;
- quality of education;
- teaching capacity, gender specific; [input: WB report 1992].

2.2 Health (show urban/rural difference)

Present situation (see baseline study Roy Stoves)

- morbidity patterns of water-borne diseases (like cholera, typhoid, diarrhoea; schisto and malaria) and airborne diseases (Cough, pneumonia etc) as an indicator of pollution;
 - * 10 most common illnesses of children and adults, if possible desegregated for age, socio-economic group and gender);
 - * 5 most common causes of death for under 1 year, under 5 year and adult men/women;
- situation of health service related constraints like accessibility and distribution of services, quality of care, health education practices, availability of (essential) drugs, MCH-services (including Family Planning);
 - * % of population with access to services (urban/rural);

- * number of new consultation per person per year;
- * contraceptive use of men and women;
- health manpower situation (including existing training facilities for men and women) and programmes for continuous education;
 - * number of doctors/nurses/midwives per 1000 population taking gender into consideration;
- food availability and composition along gender lines (malnutrition per age group?);
 - * % of under fives with moderate and severe malnutrition;
 - * % of infants with low birth weight;
 - * breastfeeding habits (prevalence and duration);
- situation of animal health services (vaccination, cost and general use);
 - * some general indicators for health status:
 - Infant Mortality rate
 - Maternal Mortality rate
 - Under five Mortality Rate

2.3 Water and Sanitation

Present situation

scarcity of available water (urban/rural disparity):

- supply systems, distribution and use;
 - * % of population with access to safe water;
 - * waterconsumption per capita;
- water quality (water pollution bacterial and chemical) (indicators for monitoring);
- water-rights versus private initiative, legislation in this respect;
- existence of sanitation practice (bring out urban/rural difference);
 - * % of population with access to latrines;
 - * frequency of use of latrines;
- existence of sewerage systems and waste-water disposal, including treatment and maintenance (O&M) in urban situation (bring out local initiatives);
- existence of solid waste- and garbage disposal systems (bring out potential for community participation and awareness, including financial contribution);
- no legislation of solid waste and waste water disposal (attention for local initiatives);
- agriculture (sharing of scarce water; priorities);
- re-use of water;
- lack of proper water quality, and sanitation systems in urban areas.

Trends

- increasing demand of water per capita for consumption (and agriculture) as part of general development;
- increasing waste, waste water and garbage;
- increasing transport of water to places where needs are high (both for drinking and irrigation purposes!).

2.4 Infrastructure

Present situation:

- poor accessibility.
[the Commission decided that lack of electricity is not a problem].

Trends:

- oil companies improve roads;
- local initiatives to improve roads.

3. The enabling environment (meso /macro levels)

(all aspects relevant to macro level are also applicable to meso level)

- marketing (meso);
- lack of policy (e.g. on health aspects);

Institutional capacity:

- lack of legislation (macro) [note: local legislations are not respected anymore];
- enforcement of legislation (macro);
- no funds for steering (e.g. incentives) (meso);
- lack of coordination (macro);
- poor planning capacity (macro);
- lack of qualified manpower;
- NGOs in their infancy stage;
- price and tax policy.