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BENCHMARKS AND INDICATORS

Report of the Permanent Inter-State Committee on Drought Control in the Sahel (CILSS) and the Sahara and Sahel Observatory (OSS) on their initiative on the development of benchmarks and indicators

Note by the secretariat

1. By its decision 11/COP(4) of 22 December 2000, the Conference of the Parties took note of the important progress achieved on benchmarks and indicators by the Permanent Inter-State Committee on Drought Control in the Sahel (CILSS) and the Sahara and Sahel Observatory (OSS) in Africa and by Parties in the group of Latin American Caribbean countries and in other regions.

2. Having also taken note of the proposal by CILSS and OSS on the development of benchmarks and indicators, the Conference requested CILSS and OSS to report on progress in this initiative to the Committee on Science and Technology at its fifth session.

3. In the annex to the present note the secretariat is transmitting the report* prepared by CILSS and OSS for consideration by the Committee on Science and Technology.

* The report is reproduced as received by the secretariat of the Convention to Combat Desertification, without formal editing.

CILSS

REPORT

ON MONITORING-EVALUATION OF IMPACT AND IMPLEMENTATION INDICATORS FOR ACTION PROGRAMMES TO COMBAT DESERTIFICATION

5th CCD Conference of Parties

Geneva, October 2001

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FOREWORD

One of the main lessons the Convention to Combat Desertification (CCD) drew from past experience was the need to keep regular track of changes in the combat against desertification in order to be able to take corrective measures before it is too late.

This explains the importance, even the vital necessity to dispose of tools to measure past efforts, tools that can identify gaps that need to be filled, and ensure full implementation of action programmes that have been selected, at all levels, *i.e.* local, sub-national, national, regional and international. Indicators make up the required measurement tools.

Through decision 11/COP.4, the CCD Conference of Parties called upon CILSS, GRULAC and OSS "to continue their initiative on the development of benchmarks and indicators in collaboration with other partners". It also requested that "progress of this initiative (be reported) to the fifth session of the Committee on Science and Technology". The related terms of reference are set out in Annex 1.

Ensuing this decision, CILSS, OSS and GRULAC set up an electronic discussion group on the Internet and, together, organised an international workshop in Ouagadougou, Burkina Faso in May 2001. These initiatives provided an opportunity for specialists from countries and organisations in Africa, Latin America and Asia to share experiences and to formulate recommendations on overcoming certain constraints hindering people working on monitoring-evaluation of CCD Implementation.

This report brings out the main results and initiatives of the three organisations, and work carried out in Asia, with China as the example. It is structured as follows:

1. Basic concepts and definitions.
2. Experiences underway in Latin America, Asia and Africa, and constraints experienced.
3. Selection criteria for a minimum set of action programme impact indicators.
4. Preparation of recommendations to the STC and the COP.

I. BASIC CONCEPTS AND DEFINITIONS

1.1 Components of Monitoring-Evaluation (M&E)

The regular production of indicators and other decision-support products requires the establishment and/or strengthening of national multi-source, multi-scale georeferenced data collection, processing and observation systems that contribute to the development of monitoring-evaluation of action programmes to combat desertification.

The size of the task varies from country to country, depending on the existing technical capabilities, the quantity and quality of available human resources, and the capacity to control and process useful information and data. What we mean by monitoring-evaluation (including components and ultimate goals) needs to be defined.

M&E is an integral part of the CCD implementation planning process at the country levels (see diagram 1).

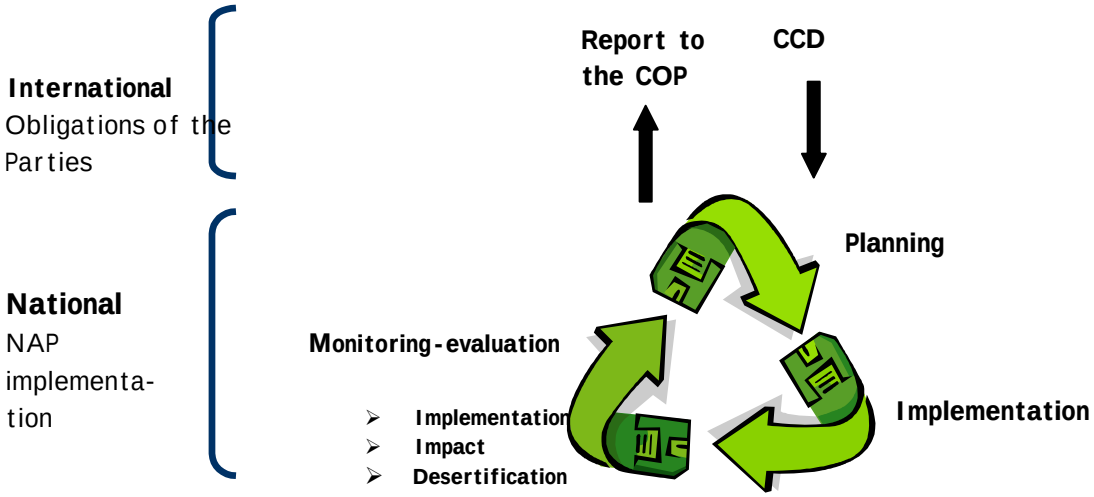


Diagram 1. Monitoring-evaluation of the CCD and NAP implementation cycles

In the broad sense of the term, monitoring-evaluation brings together the following elements:

- existing georeferenced information systems, (and thus can be seen as an integrator for the network covering these systems);
- M&E develops permanent links between the producers and users of the information being processed;
- M&E is characterised by the existence of rules and procedures for regulating information exchange;
- M&E includes institutional structures and organisational mechanisms for information management. This dimension of M&E is essential when considering capacity-building needs, training, and cost evaluation for establishing/enhancing monitoring-evaluation.

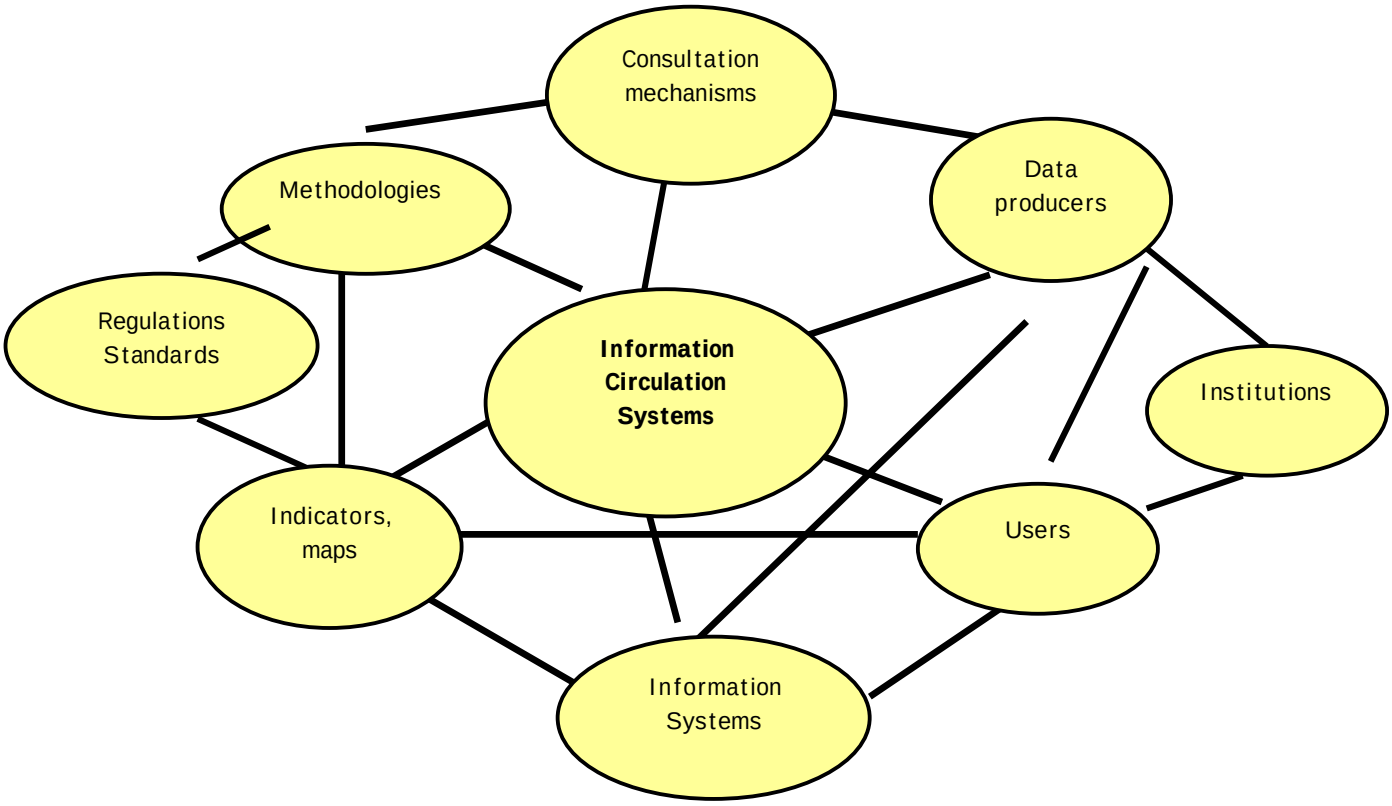


Diagram 2: Elements of monitoring-evaluation

1.2 Types of monitoring-evaluation developed in the field of desertification control

NAPs can be used as a suggested framework for future activities in the field of desertification control. They are implemented in a manner that calls on the participation of a large variety of national stakeholders and that decentralises responsibility for actions and decision-making with regard to the combat against desertification. This is done within the framework of NAP programming and strategic requirements.

At the implementation stage, action is not only guided by CCD focal points, but also by a great variety of stakeholders from various ministries, NGOs, specialised institutions, local communities, etc. The NCB (National Coordination Bodies) thus have to carry out a complex managerial task and must be able to:

- determine the degree of desertification and monitor its evolution, in other words, ensure **desertification assessment;**
- intervene to ensure that activities live up to the CCD or appropriate NAP principles or "quality criteria", *i.e.* **monitor the implementation process** for action programmes (including their quality);
- evaluate impacts (biophysical, socio-economic, institutional) of the NAPs and determine how well they are goal-oriented (more or less precise), in other words, **monitor impact.**

It is also up to them to monitor actions undertaken as part of NAP implementation, *i.e.*, monitor input.

Desertification assessment

Monitoring desertification mainly entails ecological monitoring and observation. It focuses on changes in land degradation[1], regardless of whether the cause is manmade or natural, the result of a NAP or another intervention strategy. Desertification is usually monitored through scientific research and specialised institutions in order to better understand and evaluate desertification and drought as phenomena, as well as the related effects. This type of monitoring is generally carried out through more-or-less short-term research projects or on a long-term basis through observatories.

Impact monitoring

Impact monitoring includes in the collection, processing and dissemination of information that may provide insight into biophysical, socio-economic, institutional and behavioural changes resulting from the application of action programmes to combat desertification at various spatial levels (sub-national, national, sub-regional and regional). Since the effects of a measure or action do not occur simultaneously as the measurement is being made or the action is being carried out, the time lag between cause and effect has to be factored into the time plan for impact monitoring.

Further; impacts observed often stem from various factors that are to be added to the results of actions planned to combat desertification, hence the need to analyse the context in order to identify the most decisive ones. The complexity of reality also explains the importance to be given to monitoring actions at a certain scale (local or national projects).

Monitoring NAP implementation

Monitoring indicators for NAP implementation should make it possible to assess the quality of the processes started up at various levels and the degree to which the various categories of stakeholders respect their commitments concerning the formulation and implementation of action programmes. Indicators provide information on the implementation, at the national level, of the major CCD innovative principles in combating desertification: promotion of the participatory approach, introduction of mechanisms for consultation and coordination, development of an integrated approach for identifying desertification control actions and measures, improvement of the institutional and legal framework, partnership agreements, etc.[2]. They also serve as benchmarks for conducting and constantly regulating national NAP implementation processes.

1.3 Developing a dashboard for monitoring action programmes

The aforementioned monitoring types are actually closely related. The combination of products stemming from the various forms of monitoring can be used to make a NAP monitoring dashboard (see diagram 3).

The dashboard is defined as the combination of indicators designed to monitor the state of progress of an action programme and to evaluate programme effectiveness. It is updated regularly, serves as a source of information for decision-makers and provides information on the state of programme progress for other stakeholders. A dashboard is composed of the key indicators needed to make qualitative and quantitative evaluations of changes in the combat against desertification, in keeping with the objectives set out in the action programmes.

[1] The definition in Article I of the CCD says that the term “land” refers the “terrestrial bio-productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system”.

[2] Cf. OSS, CILSS, 1998: Guide d'utilisation de la grille d'indicateurs de mise en œuvre de la CCD.

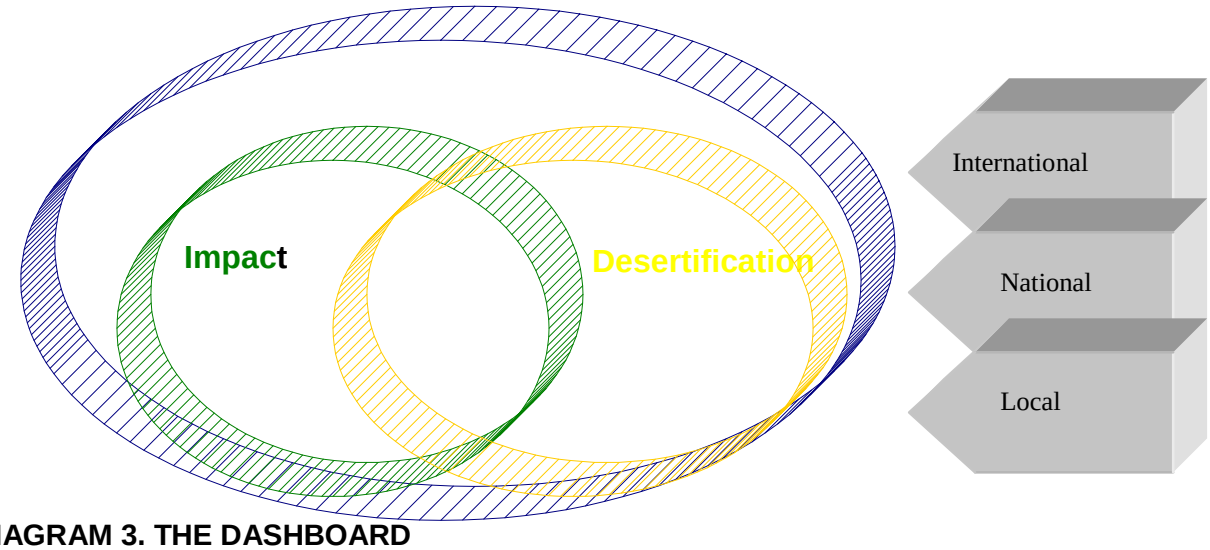


DIAGRAM 3. THE DASHBOARD

1.4 Choosing a reference system

Several models have been designed to produce environmental indicators or development indicators. The Pressure-State-Response (PSR) model is the one most used for the environment, especially since the United Nations Commission on Sustainable Development adopted it in making sustainable development indicators. The DPSIR model, an offshot of the strictly environmental PSR model, is commonly used in monitoring desertification since it is based on stress and response to pressures (see infra. desertification monitoring experiences in China, Latin America and Africa).[3]

The indicator grid for CCD implementation monitoring was designed under a logical framework which actively involved the main stakeholders in defining the objectives and the expected results of a programme or a project[4].

II. EXPERIENCES WITH METHODS APPLIED AND RESULTS OBTAINED IN THE FIELD OF MONITORING AND EVALUATION OF NATIONAL, SUB-REGIONAL AND REGIONAL ACTION PROGRAMMES

The examples of experiences in Latin America, Asia and Africa, hereinunder, do not cover the whole range of NAP monitoring forms. Thanks to their diversity, they do, however, make up a representative sample of the various current-day perceptions of desertification assessment and impact monitoring for actions to combat desertification.

Here follows a few experiences in constructing indicators, divided into desertification monitoring, action programme impact monitoring, and CCD implementation monitoring.

2.1 Experiences in monitoring desertification

Asia: Monitoring desertification in China

Various countries in Asia, *e.g.* China, India and Japan (see work underway within the framework of the regional monitoring-evaluation action programme for Asia – TPN1), since the 1970s have been working

[3] Cf. Hardy, P, Barg S, Hodge T, Pinter L,. La mesure du développement durable : étude des pratiques en vigueur. Separate document no. 17, IIDD, November 1997 IIDD, 1997

[4] Cf. document AC A/AC.241/INF.4.

seriously on desertification assessment. The example of China provides lessons on achievements and possibilities for (South-South) cooperation in this field.

China has very limited useful land resources, while the country's socio-economic development is closely linked to the original state, dynamic change, and future development of lands affected by desertification.

To identify areas affected by desertification, China has worked out five climatic zones based on their humidity index, as was recommended in the CCD.

The semi-arid and dry sub-humid zones of China are mainly located in the north and the west of the country. They cover 18 autonomous regions/municipalities/provinces and 471 counties, with a total affected land area of 3,317,000 km^2.

Desertification assessment for the country as a whole is carried out at three levels: national, provincial and local (the latter through sites that are representative of that level). National and provincial monitoring takes place every five years, essentially to track and analyse the dynamics of desertification. Desertification monitoring in sites that represent the local level is carried out annually, according to need and also in relation to results from the monitoring done at the provincial level. These data are then used to establish data bases on desertification monitoring. Because of its huge size, at the macro level, China prefers using remote sensing for desertification assessment.

A double entry nomenclature is used to classify the various types of desertification:

Degree of desertification + Type of desertification + Type of land use.

In this classification, land desertification types comprise: desertification through wind erosion, soil salinisation, water erosion, etc. Using these types, land desertification is expressed in terms of degradation of arable land, rangelands, and forests.

Based on quantified and measured indicators and indices, the degree of desertification is classified according to type of desertified land, *i.e.*:

- not desertified, ,
- little desertified,
- fairly desertified,
- seriously desertified,
- very seriously desertified,
- extremely desertified.

The monitoring-evaluation indicators grid includes target indicators such as the texture of the land, vegetation, soil type, etc. that could reflect the various types and degree of desertification. The indicators selection criteria need to be representative, useful, scientific and applicable. Up to now, China has used the main indicators on the state of desertification, which are used to describe and interpret the state and trends of desertification. The value of this activity is that it produces thematic maps and indicators to inform decision-makers of the scope of the desertification phenomenon and provide them with an objective basis for making decisions related to plans.

Table 2. Desertification evaluation indicators

No.	Type of desertification	Evaluation indicator
1	Wind erosion of forestlands. Wind erosion of rangelands.	Vegetation cover, plant biomass, soil-water content, soil texture, condition of surface soil, sand dune formation.
2	Wind erosion of croplands.	Crop performance, soil nutrient types, soil texture.
3	Water erosion of forestlands. Water erosion of rangelands.	Plant canopy, plant biomass, slope, erosion model, land affected by rill erosion as % of total land area.
4	Water erosion of croplands.	Crop performance, slope, soil nutrient status, technical measures.
5	Salinisation of forestlands. Salinisation of rangelands.	Vegetation cover, plant biomass, soil salt content.
6	Salinisation of croplands.	Crop performance, soil salt content.

LATIN AMERICA: INITIATIVES AT THE REGIONAL AND NATIONAL LEVEL

INITIATIVES AT THE** REGIONAL LEVEL **CONCENTRATE ESPECIALLY ON DESERTIFICATION ASSESSMENT, WHICH MAINLY ENTAILS MONITORING LAND DEGRADATION. AS AN EXAMPLE, SEVERAL REGIONAL WORKSHOPS THAT BROUGHT TOGETHER COUNTRIES SUCH AS ARGENTINA, BOLIVIA, BRAZIL, CHILE AND PERU LED TO THE PREPARATION OF A PROJECT DOCUMENT ON "OBTAINING AND EVALUATING INDICATORS FOR LATIN AMERICA AND THE CARIBBEAN", A PROJECT COORDINATED BY THE ESQUEL FOUNDATION.

MEETINGS OF CCD FOCAL POINTS IN LATIN AMERICA, IN 1999, LED TO THE PREPARATION OF A PROJECT ENTITLED "EVALUATION OF INDICATORS ON THE SOCIO-ECONOMIC IMPACT OF DESERTIFICATION AND LAND DEGRADATION". THE MAIN AIM OF THE PROJECT IS TO PROVIDE THE GOVERNMENTS OF THE VARIOUS COUNTRIES IN THE REGION WITH RELEVANT ANALYSES OF THE DESERTIFICATION PROCESSES FROM THE ECONOMIC AND SOCIAL ANGLE, AND TO PROVIDE A BASIS FOR WORK ON APPROPRIATE DEVELOPMENT OF PUBLIC POLICIES IN THE ARID AND SEMI-ARID REGIONS AFFECTED BY DESERTIFICATION.

In Argentina, the first actions were directed to developing indicators on desertification assessment at the local and regional levels, in particular in the Mendoza region. Experiences focused on developing a methodology to obtain indicators for the twofold purpose of:

- disposing of a set of desertification state indicators that are easily identifiable and measurable in order to build up a harmonised methodology for strengthening capacities in Argentina and Latin America;
- applying this methodology in order to better understand the state and trends of desertification with a view to taking corrective measures in support of sustainable management.

Under the ægis of the CCD, the Argentine CCD Focal Point set up a "group for the identification and evaluation of desertification indicators". In 1997 and 1998 this group worked on defining indicators per thematic domain (biophysical, social, economic indicators, etc.). The indicators were analysed according to specific locational situations, dynamics and responses (vulnerability, human pressure, etc.)[5] After a critical analysis of this experience, work on indicators focused on selecting a small number of key indicators in each region in order to include them in a simple, controllable monitoring model. These indicators will be adapted to the social and environmental conditions of each region and will be validated through case studies[6].

[5] Cf. http://www.medioambiente.gov.ar/areas/direcs/default.htm

[6] Abraham, E, 2000: "Demand driven definition of indicators", Process Monitoring, Impact Indicators and Monitoring and evaluation for National Action Programmes, side-event to the COP4, Bonn, December 2000

Furthermore, Argentina also participated in determining provincial level desertification indicators for the international desertification atlas (UNEP, 1991). The results were interesting from the point of view of knowledge on the state of desertification but did not provide the information needed to understand the dynamic evolution process of desertification. Additional actions were carried out to generate knowledge on the evolution of the process; this entailed examination of historical data available on the region in question and served to instigate a process whereby the state and tendencies of selected indicators could be compared.

Within the framework of CCD implementation, **Mexico** gave priority to developing a model for measuring and evaluating progress in combating desertification and land degradation. It broached the question of CCD indicators from the angle of land degradation indicators, drawing on its past experience in this field, which, in particular, explained the choice of the CCD Focal Point.

Land degradation monitoring in the various regions of the country was the spadework for a remarkable data base, cartographic products at various scales, and the preparation/utilisation of nomenclatures for spatial representation of cartographic information according to scale of representation.

Plans are now underway for a project on the implementation of a "monitoring system for the state of lands". This project is to be carried out together with Chile and Peru, within the framework of a more global, regional project on "An indicator model for ecosystems of arid zones". It will first be tested in one region.

Mexico established an information network (RISDE) and a Web site that provide information on the results of programmes on sustainable development indicators, with emphasis on themes relating to land degradation and desertification.

Table 3. Thematic indexes on natural resources, selected by Mexico (excerpt)[7]

• Socio-demographic and economic profiles • Soils • Water • Atmosphere • Forestry resources • Maritime and aquacultural resources • Agriculture

Indicators, thematic maps and statistical data that are available and disseminated bear mainly on the following:

- Principal soil types,
- Fertility of agricultural soils, 1996
- Land use,
- Soil degradation, 1999.
- Land area affected by the desertification process, 1987.
- Principal types of land, per federating entity,
- Land area affected by wind and water erosion.

Africa: Regional initiatives

For the Africa region, two experiences are highlighted to illustrate current efforts in desertification monitoring: activities at the AGRHYMET/CILSS Centre and activities of the ROSELT/OSS programmes.

The AGRHYMET/CILSS Centre

The AGHRYMET/CILSS programme was started following the 1972-73 drought and was used to develop an integrated information system to detect, monitor and help understand the nature and speed of changes in the Sahelian environment. The system works, and provides information to NRM (natural

[7] http://www.semarnat.gob.mx/estadisticas_ambientales/

resource management) stakeholders and decision-makers regularly. It draws heavily on new information technologies and has facilitated the construct of several major data sets on the agro-ecological conditions of the Sahelian environment and the development of models for monitoring the evolution of rainfall, water resources, soil resources, land use and bio-plant cycles.

The mechanism installed by AGRHYMET/CILSS functions as a network for observing the water- and climate-related variables and components in the various ecological zones in order to cover the spatial diversity of the agro-hydro-meteorological phenomena and variation in time. All these data are processed and analysed in an information system to determine effects common to early warning and to natural resource management.

The system for monitoring the state of vegetation developed by AGRHYMET/CILSS is based on the radiometric characterisation of the biological rhythm of vegetation which is still the primary indicator of desertification, *par excellence*. The AGRHYMET/CILSS Centre has also created a mechanism for monitoring environmental effects connected to manmade activities (changes in utilisation modes for soil and vegetation cover, land use, etc.).

Together with several partners from the North, AGRHYMET/CILSS is also developing cartographic products and models as part of efforts to install the early warning system. One example is the methodology, involving an expert system, used in the “Early Warning and Agricultural Productions Forecasts Project” carried out with Italian development cooperation (CeSIA). Cartographic products and indicators made under this project should also be useful to decision-makers elsewhere in West Africa.

The ROSELT/OSS Programme (Long-term ecological observatories monitoring network)

ROSELT data on long-term environmental monitoring are, in the main, data collected in the field (measurements and/or observations), generally rounded out with data from remote sensing, compiled as part of long-term monitoring work. These data stand as inputs or integrated parameters for information processing tools used in spatialisation models of processes under study. The aim is to generate decision-support products at the local, national and regional scales. These data make it possible to obtained cartographic products in the following fields:

Table 4. Areas monitored by ROSELT

Data	Fields
Bio-physical:	***Climate***: rainfall, meteorological data. ***Land and water***: quality and spatial distribution. ***Vegetation***: phytomass, pastoral value of species, spatial distribution. ***Fauna***: livestock, structure and spatial distribution of herds.
Socio-economic	To characterise populations: ethnic groups, population structures. To identify location of populations. As concerns the functioning of social groups: decision-making level, administrative and customary area boundaries *(terroir)*, land tenure rules applied to access to resources. To characterise uses and activities.
Aerial and satellite images	Basis for field data spatialisation and extrapolation to refine existing maps of the environment, and monitor environmental dynamics.

Indicators for the system studied (environmental indicators) are calculated for each diagnosis in each observatory. They are mainly used in inter-observatory comparisons.

Table 5. Main classes of state and response indicators in the system studied

Indicator	Remarks
Land use (in map form)	This is composed of the following elements: plant formations (dominant plant types, vegetation strata: classification by height + % of land covered, dominant or co-dominant plant species), degree of artificialisation and form of vegetation.
Soil aptitude according to utilisation / Farmer's perception of land (in map form)	The map on the physical aptitude of the soil to sustain crops, for instance, using traditional agricultural practices comes from the interpretation of the morpho-pedological map, soil surveys and interviews with the farmers.
Degree of artificialisation per utilisation type	Indicator of intensity of manmade action on renewable natural resources: *e.g.* degree of artificialisation combined with agricultural activity = sum of degrees of artificialisation linked to each component of the typology of local agricultural practices.
Exploited land area by type of usage or "usage area"	Area actually exploited, according to type of utilisation by a community (village and/or camps…).
Resource availability (in map form)	Land available for agriculture (result of use/resource interactions = agricultural output), aboveground biomass available and accessible for livestock and forestry.
Resource removal (in map form)	Map produced using spatialised models of agricultural, pastoral and forestry practices.
Status of resources/usage per type	Outcome of crossing resource availability and resource removal maps.
Status of resources/multi-usage (in map form)	Calculated using status data per utilisation type, and thanks to the existence of spatially predefined reference units, which is a reference for all activities.

As part of a network for long-term assessment, **desertification indicators** are generally of the progressive or regressive "evolution curve" type and can be expressed in evolutionary models. The ROSELT approach, however, is part of a regional mechanism for monitoring desertification, as per the description below.

Links between early warning systems, desertification assessment/observation, and action programme implementation

The panel of experts on Early Warning Systems created by the STC/CCD examined the question of relations between early warning and desertification monitoring by studying three basic, technical aspects:

- data collection, accessibility and integration;
- evaluation, prediction, and preventive measures for drought and desertification;
- dissemination of information to end users on: applications of early warning systems, desertification monitoring-evaluation, and strengthening appropriate response mechanisms.

"Early warning for drought prediction and assessment, and monitoring and assessment for desertification are fundamentally interrelated yet operationally different activities. Currently no operational early warning system exists for desertification".[8]

Actually, for monitoring desertification and for early warning, institutions use the same tools and methodologies for information collection, processing and dissemination (satellites, GIS, etc.) but different timescales. According to the *ad hoc* group on Early Warning Systems, certain indicators are common to both the drought early warning systems and the desertification information systems (ICCD/COP(4)/CST/4). The difference is mainly in the timescale, since observation of desertification as a phenomenon refers to a longer timescale than drought monitoring.

2.2. Experiences in monitoring CCD implementation

The first CCD Conference of Parties (COP1) adopted an indicators grid on CCD implementation[9] and requested the countries to test it, check the relevance of the suggested evaluation parameters and indicators, and report to the COP on their usefulness in the preparation of national reports. OSS and CILSS tested the indicators grid by using it in evaluating national NAP formulation processes in a small number of interested African countries[10] through an approach based on participatory national self-evaluation workshops that brought together various categories of stakeholders involved in NAP implementation, *viz*. central government, local communities, technical public sector services, scientific/technical institutions, research institutions, NGOs, professional groups, and, in certain cases, partners-in-development.

OSS and CILSS drafted a manual on using the CCD implementation indicators grid[11] which served as a reference during the various national workshops. The analysis of the test results led to certain ascertainments that are still applicable, *i.e.*:

- Workshop participants appreciated the indicators grid, and took it to be a tool of use in discussions that could lead to common viewpoints;
- The grid needs to be adapted to match the realities of the national processes;
- A definition of quantifiable objectives and benchmarks for each of the indicators selected is needed to round out the grid.

The main lessons from this exercise were that:

- process evaluation is mainly qualitative and requires an iterative, participatory approach;
- all categories of NAP stakeholders should participate in the evaluation process to ensure high quality evaluation and develop a common understanding of the NAP objectives and targeted results;
- participants need sound information on the evolution of the NAP and its results in order to be able to participate and evaluate the processes well;

[8] (ICCD/COP(4)/CST/4).

[9] Cf. document AC A/AC.241/INF.4, 22 November 1996

[10] Senegal, Niger, Burkina Faso and Tunisia

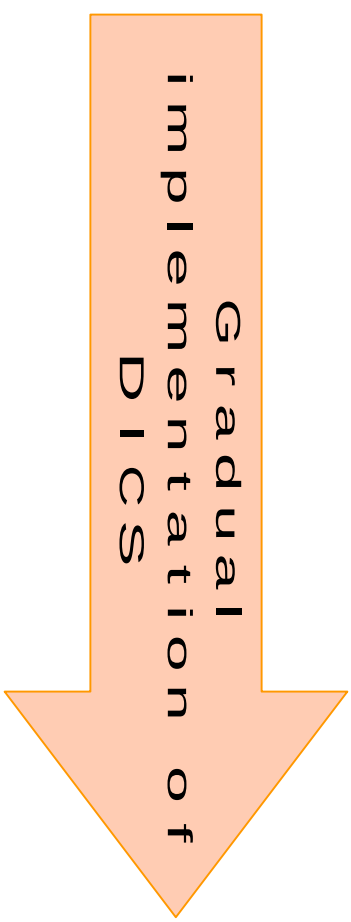
[11] http://www.unesco.org/oss

- the evaluation exercise should lead to the preparation of a complete grid of permanent indicators for monitoring and evaluating the NAP process and impact;
- establishing monitoring indicators, presupposes the existence of the NCB as a stable organisation capable of measuring performance regularly.

2.3. Experiences in monitoring the impact of action programmes to combat desertification

Since 1997, OSS and CILSS, together with six African countries have been developing and testing an approach for M&E implementation and impact indicators production that is included as an integral part of the NAP implementation cycle (Table 6). In this approach, the first step is to inventory and evaluate what exists, in particular, data, information systems, (GIS, EIS) and environmental observation mechanisms. Desertification information circulation systems (DICS) are established alongside the procedure used to construct and disseminate impact indicators. Since the various steps in the approach depend on national realities, the presentation below is not necessarily in chronological order.

Table 6. Steps in formulating and disseminating impact indicators



Identification of NAP objectives and sub-objectives, and classification according to user groups	Installation of a mechanism for consultation between data users and producers
Integrated analysis of objectives and underlying problems (after prior definition of the logical framework)	
Identification of indicators that best illustrate the various levels of each objective	
Political and technical validation of indicators selected	
Identification and characterisation of data needed to formulate and compute the various indicators selected	Analysis of the national and/or local situation as concerns production and dissemination of data on various problems identified
Calculation and analysis of calculable indicators	
Formulation of an action plan to produce data that is needed but not yet produced, and for capacity-building	
Dissemination of results	

Two main, complementary sets of indicators have been determined: indicators with a common basis for all countries and country-specific indicators that are connected to the NAP objectives. The primary indicators have been established in relation to the two fundamental CCD objectives: sustainable management of natural resources and improving living conditions for populations in the affected zones. These indicators are common to all the partner countries and serve, in this field, as the minimum information base required for reporting on changes in the combat against desertification. They should be

of use in harmonising desertification control monitoring tools and make it possible to compare changes in action programmes among the countries.

Certain indicators, such as rainfall and evapotranspiration, are not considered as impact indicators as such, but data they generate are needed in order to understand whether impact indicators specific to the individual action programmes are moving in a positive or a negative direction. Further, the combined analysis of several indicators makes it possible to identify trends and formulate hypotheses and recommendations that can enlighten the decision makers. These primary indicators are strongly related to, or, in some cases, the same as certain sustainable development indicators. This convergence contributes to harmonising indicator production activities at the national level and to improving global desertification indicators that appear in the list of sustainable development indicators.

TABLE 7. PRIMARY INDICATORS INITIALLY ADOPTED FOR THE OSS-CILSS PROJECT

OBJECTIVE	***PRIMARY INDICATES SELECTED***
Poverty eradication	1. % of the population living below the poverty threshold
	2. Female/male income ratio
	3. Rural exodus
	4. Nutritional state of children under 5 years of age
Natural resources management	1. Land use
	2. Soil vulnerability
	3. Rainfall (in time and space)
	4. Evapotranspiration
	5. Geographic distribution of useable water resources (quantity and quality)
	6. Abstraction index for exploitable water resources
	7. Evolution of vegetation cover
	8. Evolution of plant biomass
	9. Agricultural resources
	10. Animal biodiversity

This approach has been applied in a variety of ways in the CILSS and OSS member states. In Senegal, for instance, indicators were taken up in a grid that included not only the primary indicators but also the impact indicators connected specifically to the Senegalese NAP/CD (combating desertification) objectives[12]. Tunisia constructed its NAP impact indicators systems on the basis of its experience with sustainable development indicators, *i.e.,* many indicators selected for NAP impact monitoring have already been defined or calculated as part of the work on sustainable development[13]. In Burkina Faso, the impact indicators selected for the NAP were produced with reference essentially to the

[12] OSS, CILSS, 2000 : Systèmes de suivi-évaluation des PAN - Expériences et leçons du test de la méthodologie d'élaboration des indicateurs d'impact de la CCD

[13] Idem

operationalisation of the PNGIM (national programme for managing information on the environment), which was designed as a dynamic network of data generating institutions[14].

Other countries like Niger, Mali and The Gambia are using the same approach. To construct its national NAP monitoring-evaluation system, Niger decided to start by relying on a hard core composed of major state projects and certain NGOs that could provide the critical mass of reliable information of use in the NAP monitoring-evaluation system.

Mali gave priority to external monitoring-evaluation of desertification control projects and adopted an approach that sought to establish and manage a computerised repertory of environmental projects (RIPE - *Répertoire Informatique des Projets Environnementaux*) covering all planned and ongoing interventions that could have a direct, significant impact on the environment and promote sustainable development. The Malian policy-makers felt that this option reflected a careful way to build up a monitoring-evaluation system based on a well thought out assessment of the NCB's managerial capacity.

Through its environmental action plan, GEAP, The Gambia did a remarkable job in thinking out benchmarks and indicators. The first outline of the indicators grid presented thematic domains, (forestry, fishery, soil conservation, wildlife management, rangeland management, water resources management, energy supply, agricultural production, marketing). Each indicator was designed to receive information using the following parameters: point of departure (data, year, source), quantitative objectives, source of data, institution in charge.

Morocco, which just validated its NAP, incorporated the OSS-CILSS approach in its implementation strategy for the NAP national M&E system. Algeria also solicited assistance from OSS to define an M&E model to use now in formulating its National Action Programme.

2.4. Difficulties encountered

It is difficult to draw up a complete catalogue of difficulties encountered in installing an effective CD (combating desertification) action programme monitoring-evaluation system. Experiences underway in North and West Africa indicate the following difficulties as the most important:

- **Absence of priority for monitoring-evaluation:** When allocating resources, national decision-makers do not give special priority to this aspect of their national action programme. The result, *inter alia,* is lack of a dedicated, specialised, permanent staff. Example: in the "CCD M&E and impact indicators" project, no OSS or CILSS partner state has established, or been able to establish a permanent monitoring-evaluation unit.

- **Difficulty in harmonising methodologies for information collection and processing because of proliferation of information and monitoring systems** that already exist in development projects. Data collection and processing methodologies and tools are often very different from one project to the next. Data from the various stakeholders are often difficult to combine and possibilities for information and data exchange are weak, both at the national and the regional level.

- **Lack of harmonisation in scales for data measurement and representation**[15],

- **Insufficient understanding:** In many countries, the NAP is perceived as a sectoral programme that belongs to the ministry in charge of formulating and/or implementing it.

- **Major technical and institutional difficulties in producing results the decision-makers can use:** Institutions specialised in producing indicators in the developed countries generally use networks of statistical or other operational data bases. They rarely have to produce or pay for the production of all the data needed to construct the required indicators. The example of the test with sustainable development indicators is rather illustrative. Most sustainable development indicators relevant to the

[14] Idem

[15] CONSERE, October 2000 : Indicateurs et repères pour le suivi-évaluation du PAN/LCD

developed countries have already been produced in various forms by specialised organisations. This is not the case in developing countries where the production of a given indicator generally means having to go through all the steps in the process, namely, information collection, processing, and dissemination.

- **Insufficient knowledge of existing monitoring-evaluation tools and products:** Part of the difficulty in mastering the methodological aspects of monitoring-evaluation comes from the weakness in human resources assigned to NAP monitoring-evaluation. For certain NAPs, for instance, the operatives clearly have trouble in making a precise diagnosis of the desertification phenomenon in their country or in adequately understanding how to analyse the "cause-effect" relationship.

- **Insufficient organisation of information on existing data.**

- Low level of regular information collection, and information standardisation and characterisation, absence of georeferenced data and quantifiable economic data on the environment and natural resources, absence of an official national framework for harmonising existing data bases on combating desertification and making them coherent with each other.

III. SELECTION CRITERIA AND FULL SET OF COMMON IMPACT AND IMPLEMENTATION INDICATORS DESIGNED TO FACILITATE INTERREGIONAL COMPARISONS

3.1. General remarks

During the international workshop in Ouagadougou (June 2001), the participants noted that:

- Factors that contribute to desertification and manifestations of the desertification phenomenon vary from one region to the next and even within countries.
- The format and contents of the NAP differ from one country to the next. In certain countries the NAP is a strategic framework, reference for the development of independent activities by the stakeholders. In other countries, it is a catalogue of projects to be implemented.
- As concerns programme and policy impact evaluation, countries' choices depend first and foremost on their technological, financial and technical capacities. Countries of sub-Saharan Africa, for instance, could benefit more from participatory context-related approaches, involving qualitative monitoring of the socio-economic impact of the NAPs and LDPs (local development plans) than from classical concepts whose feasibility depends on the availability of pilot sites and adequate research capabilities.

Considering the above, for NAP monitoring it seemed best to adopt a pragmatic, gradual procedure for constructing and then harmonising indicators and, **in the initial stage, provide support for the development of common sub-regional or regional indicators.** This choice should be paralleled with efforts to strengthen inter-regional experience exchanges in order to optimise achievements in various countries and move towards a better level of mutual understanding of conditions prevailing in the combat against desertification in each region specifically.

Process indicators certainly lend themselves more readily to rapid generalisation because:

- they are the direct outcome of reflection on the contents and objectives of the CCD, which is a universal text adopted by all the countries, and,
- they have already been taken into account when working out the standard format for the national reports at the Conference of Parties.

In any case, on the one hand, a good indicator must be **adapted** to the problem, be based on **reliable** data and analyses**,** and must respond to the users' needs[16] , and, on the other, each region must carefully respect the following criteria when selecting indicators:

[16] (Rump,1996),

Pertinence: The indicator must give an exact image of the situation that gives rise to a problem and must respond to changes in this situation. It must include a threshold or a targeted value that can reflect trends.

Reliability: The indicator must be valid from an analytical point of view or be based on reliable subjective knowledge.

Usefulness: The indicator must be simple, comprehensible, and expressed in terms the user is used to and accepts as an accurate reflection of "his/her" problem. Data needed to construct an indicator must be available or be accessible with a **reasonable cost/benefit** ratio.

Measurability: The indicator needs to be quantifiable or mappable. Data that feed into the indicator must be **updated** regularly using reliable procedures.

3.2 Indicators to monitor CCD implementation: developing a dashboard on combating desertification

One useful application of CCD implementation monitoring indicators has been their contribution to the definition of the standard format for the national reports that the states have to submit to the COP. But the Parties as yet have not been monitoring them regularly: this applies to the NCBs in their daily responsibility for process management and to the partners-in-development in the evaluations they call for as part of their support for the national processes. The national decision-makers, now that several monitoring initiatives are being taken through components of CCD actions, — land degradation monitoring, process monitoring, impact evaluation, etc. — feel the need for a global dashboard that can give them an encapsulated picture of all facets of the National Action Programme. The updated CCD implementation indicators grid, as a decision support tool, could serve as the frame for the dashboard.

Aiming at the target group established by the NCB has made it possible to identify the implementation indicators that can be used in constructing the NCB dashboard. During the NAP implementation phase, the implementation indicators grid can also include the NAP impact indicators listed in the table below. These impact indicators feed information to indicator no. 8 entitled **"Action Programme implemented in compliance with the priority fields set out in the Convention."**

Table 8. List of indicators proposed as common indicators for monitoring NAP implementation, including impact indicators derived from NAP objectives

	Indicator	Parameters in the evaluation
1.	**National Coordination Body (NCB) operational**	• Legal status • Intersectoral and multidisciplinary character • Composition and mode of functioning • Resources
2.	**Stakeholders' participation in NAP implementation**	• Nature and scope of information, training and communication actions • Methods of participation for various stakeholders in defining local development plans as part of development projects in affected zones
3.	**Support from international partners**	• Degree of participation of developed countries and international organisations • Number of partners providing financial support • Amount of resources available • Informal process established and functioning for consultation and for harmonisation of actions among partner countries
4.	*PARTNERSHIP AGREEMENTS APPLIED*	• Functioning of internal partnership agreements • Investments made during NAP implementation • Contribution from Global Mechanism
5.	*FUNDING MECHANISMS FINALISED*	• Provisions defined and applied to facilitate local stakeholders' access to existing sources of funding • New, adapted ways to mobilise national resources and external resources implemented
6.	*COHERENT INSTITUTIONAL FRAMEWORK FOR COMBATING DESERTIFICATION*	• Adoption and implementation of measures to adjust and strengthen the institutional and legal framework • Adoption and implementation of measures to strengthen the capacities of existing institutions from the local to the national level
7.	*NAP INTEGRATED IN NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN*	• Ensuring coherence between NAP and other strategic frameworks • Linkage of NAP with national, regional and local approaches • Linkage of NAP with Sub-Regional Action Programme (SRAP)
8.	*ACTION PROGRAMME IMPLEMENTED ACCORDING TO PRIORITY FIELDS SET OUT IN THE CONVENTION*	• Level of achievement and impact of measures related to: ~ improvement of living conditions of populations in the affected zones, ~ sustainable management of natural resources, ~ greater knowledge of the desertification phenomenon ***IMPACT INDICATORS DERIVED FROM THE NAP OBJECTIVES COULD PROVIDE INFORMATION FOR THIS GLOBAL INDICATOR***
9.	*EFFECTIVENESS OF LOCAL CAPACITY-BUILDING PROVISIONS*	• Degree of responsibility in natural resource management borne by local communities • Degree of decentralisation achieved in NAP implementation • Stakeholders' involvement in the monitoring-evaluation process
10.	*SCIENTIFIC/TECHNICAL CAPACITY BUILDING AND TRANSFER OF TECHNOLOGY*	• Scientific/technical cooperation agreements concluded • Percentage of resources allocated to research-development and training • Rate of adoption of technologies at the local level

11.	*OPERATIONAL NAP MONITORING-EVALUATION MECHANISM*	• Installation and/or strengthening environmental observations and monitoring mechanism • NAP impact monitoring mechanisms and criteria established • Desertification information system at national level • Main stakeholders' access to available information • Consultation mechanism for analysing results • Regular production of reports

3.3 Seeking common impact indicators using all indicators proposed in the OSS-CILSS project

The participants at the Ouagadougou international workshop examined the list of 14 common primary indicators adopted by African countries participating in the OSS-CILSS project. The analysis of these indicators led to the following remarks.

Table 9. Observations on primary indicators in relation to the objective: poverty eradication

Indicator proposed	Remarks
% of the population living below the poverty threshold	Everyone recognises the relevance of this indicator on the condition that: - the scale of measurement is "zones affected by desertification", and, - the poverty threshold is established for each country on the basis of country-specific conditions.
Female/male income ratio	This indicator, although gender-sensitive, is not considered relevant because of the absence of data required to calculate it and because of the relatively unfavourable data collection cost/benefit ratio.
Rural exodus	This indicator is relevant if the measurement scale is specified to be the affected zone and if the indicator is called "evolution of migratory flows in the affected zones".
Nutritional status of children under the age of 5	Relevant indicator whose definition and mode of calculation can be found in the WHO nomenclature.

Observations on the primary indicators related to the "sustainable management of natural resources" objective. The participants recommended that the indicators proposed be classified according to the national resources in question: water, soil, vegetation.

The list also included the following indicators: "rainfall" and "evapotranspiration". These are risk factors, not impact indicators. The suggestion was that they be removed from the primary indicators list, even though, as risk factors, they need to be monitored regularly.

Tableau 10. Proposal for grouping primary indicators per field

Domain	Indicator proposed	Observations
Land	**Land use**	
	Soil vulnerability	This is a complex indicator which requires the weighting of other indicators that have been measured and combined
Water	**Geographical distribution of mobilised water resources (quantity and quality)**	Note that in regions like the Sahel, the water points contribute to desertification because of the heavy concentration of livestock they attract. A good distribution of water points contributes to a good stocking rates on natural resources, in particular, rangelands.
	Abstraction index for exploitable water resources	This index should be correlated with the water needs satisfaction rate and the water shortage

Vegetation	**Evolution of vegetation cover**	
	Evolution of plant biomass	
	Agricultural resources	
Wildlife	**Animal biodiversity**	The suggestion is to monitor the evolution of a small number of representatives animals in the affected zones

The Ouagadougou workshop provided an opportunity to make an initial selection from among the primary indicators in the list and to set aside the ones that were “risk factors”.

Discussion also cast light on the degree of priority, — based on complexity and data availability — to be given in calculating other indicators.

These observations, nonetheless, show that a minimum set of socio-economic and biophysical indicators common to the Africa region can be constructed. In-depth discussions with other regions, along the lines of the discussions held during the Ouagadougou workshop, would make it possible to finetune the definition of these indicators in an effort to build up comparable common indicators. The grid still needs to be completed by adding the definition of quantifiable objectives and benchmarks for each of the selected indicators.

IV. FINAL RECOMMENDATIONS

OSS, CILSS and GRULAC feel that:

- The political level needs to have a genuine, real desire for change in conduct and attitude, *i.e.* accept and favour dialogue with all the partners, recognise the partners’ rights to participate in decision-making concerning targeted objectives and the ways and means to reach and evaluate them.
- Dialogue on the various monitoring-evaluation components is a process that needs to be more clearly seen in activities and results so that information-sharing can contribute to strengthening the democratisation and decentralisation processes.
- Cooperation with foreign institutions that possess indispensable data on natural resources in the desertification stricken countries is vital to the M&E exercise. Since these data, in most cases, have been collected through development cooperation projects, the aforementioned institutions should agree to share them with the national teams in the African countries concerned.

OSS, CILSS and GRULAC recommendations:

- Carry out pilot actions in national capacity-building by preparing and disseminating training modules on M&E of action programmes to combat desertification.
- Test the implementation of a NAP monitoring dashboard that includes NAP implementation monitoring and impact indicators, as per the proposal set out in this report.
- Facilitate the organisation of national workshops for evaluating the NAP implementation process in order to integrate the indicators grids as a NAP management tool.
- Promote and strengthen the development of desertification information circulation systems at the national and sub-regional levels.
- Create an international network for exchanging information and experiences on action programme M&E.
- Provide financial and technical support for states committed to establishing national M&E for action programmes to combat desertification.
- Strengthen dialogue and information exchange among organisations and experts in charge of the early warning systems, and persons and organisations in charge of implementing action programmes directed not only to the scientific/technical aspects of data processing but also to the socio-political aspects of assessing the combat against the effects of drought.

- Promote the creation of a South-South network on monitoring-evaluation and use inter-regional Africa-Asia and Africa-Latin America fora to share experiences and organise thematic meetings on the various aspects of monitoring-evaluation of action programmes to combat desertification.

Bibliography

A/AC.241/INF.4, 22 November 1996	Work underway on benchmarks and indicators
Abraham, E, 2001	Argentine experience linked to obtention and evaluation of desertification indicators
AP3A, 2000	Le contexte de la vulnérabilité structurelle par système de production au Burkina Faso, Niger, Mali et Sénégal, Agrhymet Regional Centre
Assadek, M, 2001	Système de suivi et évaluation du projet de gestion des ressources Naturelles (PGRN-Niger) ; Atelier international sur le suivi-évaluation et les indicateurs d'impact de la CCD, Ouagadougou, 21-25 May 2001
OSS, 2001	Proposition d'un concept de formation sur le suivi-évaluation des programmes d'action de lutte contre la désertification, OSS
AGRHYMET Regional Centre, 2001	Lutte contre la sécheresse au Sahel : résultats, acquis et perspectives au Centre régional Agrhymet
CNEDD, 1999	Le Niger et le défi de la désertification
CNEDD, OSS, June 2001	Atelier de lancement du système de suivi-évaluation du PAN nigérien
CONAGESE, 2001	Expérience du Burkina Faso en matière de suivi et d'évaluation du PAN/LCD
CSE, OSS, GTZ, 1998	Atelier de travail sur les indicateurs d'évaluation de la mise en œuvre de la Convention de lutte contre la désertification (CCD), Dakar, May 1998
Hardy P, Barg S, Hodge T, Pinter L,	La mesure du développement durable : étude des pratiques en vigueur. Separate document no. 17, IIDD, November 1997
Hartmut Bossel, IISD, 1999	Indicators for Sustainable Development: Theory, Method, Applications; A report to the Balaton Group
ICCD/COP(2)/CST/3/Add.1 28 Sept. 1998	Repères et indicateurs, Rapport du Groupe Spécial
ICCD/COP(3)/CST/6 25 Act. 1999	Systèmes d'alerte précoce - Données d'expérience déjà disponibles sur les systèmes d'alerte précoce et institutions spécialisées agissant dans ce domaine
Macina, G, Diallo, I, 2001	Rapport du Sénégal présenté à l'Atelier international sur les repères et indicateurs de mise en œuvre du PAN/LCD, CONSERE, 2001
OSS, 1997	Indicateurs de mise en œuvre et indicateurs d'impact pour la Convention de lutte contre la désertification, Rapport élaboré en collaboration avec le CILSS, l'IGAD, l'UMA et le Club du Sahel et en concertation avec le Mali, la Tunisie, le Sénégal, le PNUD/UNSO et l'UNESCO, Paris, March 1997.
OSS, CILSS, 1998	Guide d'utilisation de la grille d'indicateurs de mise en œuvre de la CCD, Projet, Paris, Ouagadougou, November 1998
OSS, CILSS, 1998	Application de la méthodologie d'élaboration des indicateurs d'impact de la CCD, mise en place d'un système de suivi-évaluation du Programme d'Action National, Projet, Paris, November 1998
OSS, CILSS, 1998	Le suivi-évaluation et les indicateurs d'impact de la CCD, Rapport de l'atelier Conjoint OSS, CILSS, Club du Sahel, Burkina Faso, Mali, Maroc, Niger, Sénégal, Allemagne, France, Italie, Eschborn, 21 - 23 July 1998

OSS, CILSS, 1998	La grille d'indicateurs de mise en œuvre de la CCD, un outil de consolidation du PAN, leçons tirées du test de la grille avec quelques pays africains. Rapport à la 2e Conférence des Parties de la CCD, Paris, Ouagadougou, November 1998
OSS, CILSS, 2000	Systèmes de suivi-évaluation des PAN - Expériences et leçons du test de la méthodologie d'élaboration des indicateurs d'impact de la CCD
OSS, CILSS, Club du Sahel, UNESCO, 1997	Les indicateurs d'impact et le suivi-évaluation des programmes d'action et de lutte contre la désertification, Eléments pour une approche pragmatique, Paris, July 1997.
OSS, UNESCO, CILSS, 1999	Le suivi-évaluation et les indicateurs d'impact de la CCD, Projet de guide de travail, document de base, November 1999 version
OSS, UNESCO, CILSS, 1999	Compte-rendu et communications de l'atelier sur les indicateurs d'impact de la CCD, Paris, 29 June - 2 July 1999.
S.T.P du Cadre Institutionnel de la Gestion des Questions Environnementales, 2001	Le suivi-évaluation et les indicateurs d'impact au Mali, 2001
Secrétariat Général de l'UMA, 2001	Atelier international sur les repères et indicateurs de mise en œuvre de la Convention sur la désertification CILSS-OSS, Ouagadougou, 21-25 May 2001
SEMARNAT, 2000	Indicatores para la evaluacion del desempeno ambiental ; Report 2000
Shinoda, M, 2000	Japanese Experience and Potential in Drought: Early Warning, paper for the COP4/CCD, Bonn, December 2000
Siheng, S, 2001	Practice and Research Related to the Indicators for Desertification Monitoring and Assessment, paper of China, 2001
Sillah, JS, 2001	Presentation on benchmarks and indicators for measuring progress, Ouagadougou, 21-25 May 2001
SP/CONAGESE, CILSS, OSS, 1998	Evaluation du processus de mise en oeuvre de la Convention de lutte contre la désertification au Burkina Faso, Atelier à Kaya 24-26 June 1998.
UNCCD, OSS, CILSS, UNITAR, 1999	Guide de rédaction des rapports nationaux pour la CCD, proposition, version 2, May 1999.
UNITAR, OSS, 2000	Guide GISWEB