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River basin management in Namibia

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Abstract

The present trend in water resources management is to work on a basin level, the reasons being the need to devolve information sharing, co-ordinating and decision-making level down from a centralised system and the fact that water resources are shared within a basin. In Namibia, the water sector is being reformed, also, to introduce the concept of integrated water resources management on basin level. An important aspect is the establishment of Basin Management Committees to manage water along hydrological boundaries and to involve the local communities more actively in the planning, operation and management of their water supplies and resources. As such it compliments community based management program government is implementing. To this end, basins have been demarcated using several set criteria and piloting of the stressed basin, regarding availability of water and environmental degradation, started. This paper will look at the introduction of basin management concept in Namibia and how the communities in piloted basin are embracing it. So far the communities have shown willingness to manage their own water resources as compared to the past when everything was dictated to them from centrally located decision-makers. The question however is what are the challenges this task will present to them in managing this scarce and vulnerable resource, with regard to the capacity available.

Keywords: Basin management; Catchment management; Community based management; Decision making; Water resources management

1. Introduction

The identification and integration of all issues relating to the resource base is essential both for reasons of efficiency, and to address the socio-economic and environmental challenges Namibia faces. For this reason, Namibia is moving towards the adoption of an integrated, basin-scale framework for water resources assessment and management. Such a framework will take into account all the variables—physical, climatic, ecological and human—which affect both the quantity and quality of the resource.

Developments in Namibia with regards to changes in the institutions involved in water resources management and the launching of a water sector reform programme has put emphasis on decentralisation of water resources management. This process, which has been initiated by government aims at devolving more power and responsibilities to the regional councils.

The reform process has developed comprehensive set of recommendations. These recommendations involve new approaches within the institutional framework e.g. separation of functions (management from regulation and service provider), establishing new laws, and putting in place a coherent training strategy. The new water policy and water law support the issues like integrated water resources management, and management along hydrological boundaries. This involves the setting up of Basin Management Committees to manage water at a lowest appropriate level and supports the government initiative of community based management (CBM).

In Namibia water is most of the time the most constraining natural resource and development of water infrastructure for specific purpose in an area of the basin may affect alternative expansion in other areas. Development of water and other natural resources is therefore preferably done at basin level, and it is necessary to carefully introduce this new concept for the specific conditions of Namibia, which is the driest sub-Saharan country in Africa. Already, some basins are under stress regarding availability of water and environmental degradation, and basin management should be piloted without delay, in order to deal with these challenges and also to build up competence in the field. The most sensitive area in Namibia is the Cuvelai basin which covers the central northern parts of the country and where more than half of the population lives, mostly under

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conditions of subsistence farming, because the area lacks other natural resources or industry.

To begin the process meetings with stakeholders in the Cuvelai Basin have taken place. The initial purpose was to introduce the concept of management on basin level and secondly to get the committees established and deliberate on issues such, membership, organisational structure and terms of references for the committee. Till the time of writing up this paper, the study has been going on how to accommodate the above mentioned issues. The major issues to consider when establishing these committees especially in Namibia are the topic of this paper.

The paper starts off with current situation in Namibia as related to management on basin level, few definitions and reasons why management at basin level should be considered. It follows on with similar programmes being carried out in Namibia that compliment the concept and continues with how the process has started example by demarcating basins and management units using appropriate criteria. Some functions and operating criteria for the committees are given. Example from other country like Australia are given to compare with international standards, and discussion and conclusion gives an indication how this process can be applied to Namibia.

2. A basin framework to integrate water resource issues

The complexities of Namibia's surface and groundwater circulation system make the application of conventional water resource management approaches, that have largely been developed in temperate climates with predictable rainfall regimes and perennial flows, a difficult task. Equally, the identification of trends requires good quality historical data with high temporal and spatial resolution to be combined with accurate and relevant abstraction data from all major users.

Such an accurate understanding of Namibia's climate as well as the interaction between climatic and physical determinants is at the heart of the water environment, especially as these relate to the availability of fresh water resources. The quantity of flow in an ephemeral stream depends on the frequency and intensity of rainfall as well as the condition of the catchment. In turn, infiltration and recharge depend on the quantity of rainfall falling directly on the ground and the quantity of water entering aquifers from flowing streams and perennial rivers. However, infiltration rates are also related to soil types and levels of silt load in the stream. The latter of these is, in turn, also related to catchment condition, including vegetation cover. An understanding of these processes is essential for developing and managing the resource base. A failure to address any of the issues related to knowing and understanding both physical and climatic determinants and their interaction will inevitably result in socio-economic and environmental degradation.

The primary challenge for resource managers is to anticipate and manage system behaviour and abstractions during prolonged periods of drought. Not only does drought mean reduced rainfall, it also generally leads to a shortage of grazing, overgrazing and hence catchment degradation and ultimately the erosion of topsoil. High sediment loads in the river result in a reduction of aquifer recharge. Under these circumstances, a holistic approach to basin management is essential.

Namibia's surface and groundwater resources can be divided broadly into two types, those derived from ephemeral (seasonal, non-permanent systems) and those derived from perennial systems. With the exception of short lengths of the Okavango and Kwando Rivers in the north-east of Namibia, all the rivers in Namibia's interior are ephemeral. They therefore represent an important lifeline for many people throughout the country either directly in the form of surface water, or indirectly as the groundwater sources, which they recharge. At the same time, the perennial rivers along Namibia's northern borders support many people living in relatively large numbers along their banks or close to them. The identification and integration of water resource issues across these broad physiographic limits is essential if water resource management is to address root causes of the socio-economic and environmental problems Namibia faces. For these reasons a broad basin-scale framework can be established for Namibia. Such a framework takes into account all the variables, physical, climatic and human, which can affect both the quantity and quality of the water resource base (MAWRD-1, 2000).

2.1. Definitions

A river basin sometimes referred to as a watershed, catchment or drainage basin is the area contributing to the drainage or discharge at a particular river cross-section (De Laat and Savenije, 2000). Water basins are separated by topographic features such as ridges or hills that determine the direction of the flow. In areas with negligible surface runoff water basins must be defined in a broader way by considering the underlying groundwater systems. Other factors such as interbasin transfers may also have to be considered. It is therefore thought to be more appropriate to refer to a "manageable" water basin.

2.2. Management on basin level

Basins are the appropriate units for operational management. River basin management refers to management of all activities aimed at better function of the

river basin (Savenije, 2000). The soils, geology, water and vegetation within a catchment are all interrelated; actions in one part of the basin can affect other parts of the basin.

There is very little human activity that does not have an effect on the basin in some way.

Any use and development related to the abstraction, supply or discharge of water affects the health of the ecosystem, the well being of the people elsewhere and the quality and quantity of water environment.

- In a direct manner because it determines the quantity and quality of water available for other activities.
- In an indirect manner because any development activity has socio-economic and environmental impacts.

All land use, natural processes and environmental disturbances interact in either direction with the hydrological cycle and balance within a water basin. Environmental problems are not confined to particular features or areas. If, like in Namibia's case, water is the most constraining natural resource for development, then a decentralised development and management policy is logically to be organized on a water basin basis. Natural resource development and management strategies are more effective if implemented over a whole water basin, reflecting the relation between water, land, vegetation and fauna, and the water basin's ecosystems (Van Langenhove et al., 2000).

2.3. Community based management

In Namibia CBM refers to communities and the government being partners in the process of planning, construction and/or rehabilitation and managing of the water points and water supply systems. CBM is about the way which communities and government will run rural water supply in the communal areas of Namibia. The principle of CBM has been introduced in the Water Supply and Sanitation Policy (WASP) and been broadened by the Water and Sanitation Co-ordination Committee (WASCO).

Other components of CBM include, cost recovery of rural water supply, both the financial side of managing water points and water supply systems and also the replacement of equipment when it is worm out. The new aspect to this is also paying for the water itself. Coverage component refers to access to water points as well as the quality and quantity of the resource. Within CBM, community structures are made up of different institutions with different function and powers and consequently different composition. These are either advisory institutions (Water Point Associations) who facilitate the implementation of CBM or executive institutions (Local Water Point Committees) who have the authority to carry out their decisions (MAWRD-2, 1999). These institutions and other existing local related committees have to be considered when the BMC are set-up as to be included in membership.

2.4. Demarcation of manageable units

The fact that water is shared and integrated, the country has been divided into manageable units thorough which Basin Management Committees will be established (Fig. 1). Certain criteria have been developed and used to demarcate the basin in such units.

In the beginning, 24 basins have been delimited and these are grouped under seven main groupings. It should be emphasised, and this is clear from the map, that the basins do not cover all of Namibia. The areas not included are grouped together as the low potential western desert basins and this can be considered as basin #25. For management purposes 24 basin were seen too many for a small country as Namibia. Therefore a technical workshop was held to:

- Review existing water basins and propose new ones.
- Discuss and get consensus on the framework or criteria for delimitation of water basins.
- Formulate proposals for water basins including both surface and groundwater.

The outcome of the workshop included the consensus on the principles or criteria for delimitation and 13 preliminary basins have been proposed and delimited (Fig. 1).

These criteria are:

- Bio-physical conditions and characteristics. (Geographical units—both surface and groundwater, nature of the catchments, river links, size of the basin, soil types.)
- Sharing of water (transfer of water from water rich area to poor area, impact upon down stream users, who will benefit?).
- Demand for water (population density, type of users, economic value).
- The availability of water (amount of rainfall, reliability of water resource, availability of surface and groundwater, water quality in the area).
- The involvement of stakeholders (consider needs of poor, local/community involvement, realistic partners, equitable representation, cultural relationship).
- The future development (national development strategy, long term plans, industrial/economic development).
- Sources of water.
- Existing infrastructure (development of water resources, existing infrastructure).
- Policy framework.

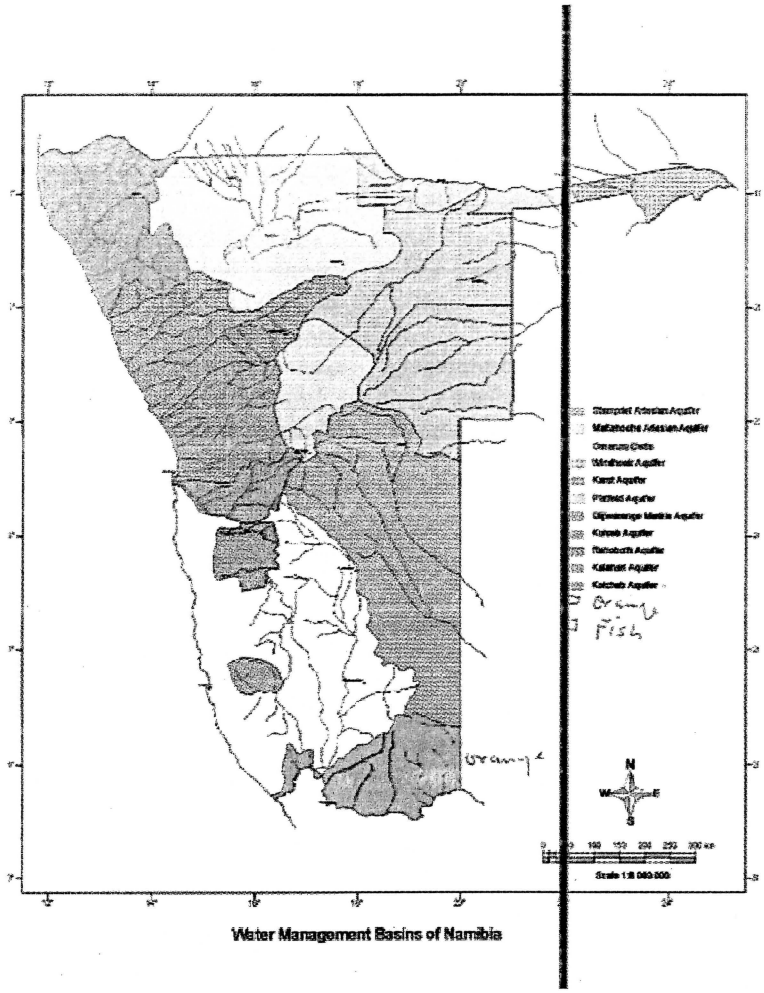

Fig. 1. Preliminary demarcated management basins.

- Ecological units (appropriate unit to determine ecological reserve, ecological integrity, environment).
- Economic viability (financial resources).

2.5. Basin Management Committees

The draft Water Resources Management Bill provide for the establishment of the Basin Management Committees by the Minister may, upon his or her own initiative, or upon the application of stakeholders within a basin. This will facilitate better management of water resources of the basins within Namibia. The Basin Management Committees provide the opportunity for communities and government to work together to assure that total water basin management is achieved. Their main function will be to advise on the way water, soil, flora, fauna and land is used, by integrating the interests of the direct stakeholders, the development plans of decentralised government institutions, the expertise of technical specialists, and the concerns for the environment.

Their objectives are:

- To oversee and co-ordinate natural resource management activities at the water/river basin level.
- To plan for achieving sustainable natural resource management for the water basin in partnership with Government at all levels.
- To encourage the most beneficial use with a view to maximising social and economic benefits.
- To embody full consultation and participation by local committees and stakeholders.
- To incorporate wide sectoral involvement in relation to the impact of development on the natural resource base in a river basin (MAWRD 3, 2000).

Their main functions, are:

- to promote community participation in the protection, use, development, conservation, management and control of water resources, including groundwater in its water management area through education and other appropriate activities;

- to prepare a water resources plan for the basin which plan shall be submitted to the Minister for consideration in the development of the National Water Master Plan provided for in Chapter 6 of Water Act;
- to make recommendations regarding the issuance of licenses and permits under this Act;
- to promote community self-reliance, including the recovery of costs for the operation and maintenance and replacement of waterworks;
- to facilitate the establishment of an operation and maintenance system of waterworks and the accessing of technical support for associations within its water management area;
- to monitor and report on the effectiveness of policies and action in achieving sustainable management of the water management area;
- to collect, manage and share such data as are necessary to properly manage the basin in co-ordination with the agency provided for in section 17 Water Act;
- to develop a water research agenda, together with the Water Resources Management Agency, appropriate to the needs of water management institutions and water users within its water management area;
- to assist with conflict resolution within its water management area; and
- to exercise any such additional functions as the Minister may delegate under sections 14(1)(d) and 15 of Water Act (MAWRD 4, 2002).
- The membership will include:
  - The direct stakeholders, i.e. the land and water users and other people who are dependent on, or affecting the availability and quality of water within the water basin area. To be included are representatives of the private sector.
  - Officials of government departments or authorities being competent in and responsible for natural resource management within the water basin area.
  - Representatives of regional and local authorities within the water basin area.
  - Persons with an interest in environmental matters, in the broader sense, within the water basin area.

Members should have the full competence and mandate to represent broad groups of stakeholders and should keep effective liaison with them.

Management committees should be limited to maximum 12 full members, with the provision that associated members are identified who may be called to attend meetings to discuss specific matters where their expertise or input is required, or who may be asked to perform particular activities in their field.

The Water Resources Management Agency within MAWRD should be the leading agency and will be responsible to ensure that all required responsibilities are duly executed. This will include the regular supervision of environmental monitoring and remedial activities and implementing of basin plans.

Their operating criteria are:

- The Committee shall administer the development by the leading agency of a suite of natural resource policies and strategies for the basin that will be the guideposts upon which development proposals will be evaluated to ensure basin sustainability.
- Any development plans or other envisaged action by responsible authorities that have a significant impact on the natural resources of a basin will be forwarded to the Committee for review. The Committee's role will be advisory.
- These plans should be discussed during regular and / or ad hoc committee meetings with members present, either being full members or being associated members called upon to report on specific issues.
- The purpose of the discussions should be to establish whether additional information is required and whether the proposed plans will contribute to the sustainable development of the water basin, or whether the plans will be contrary to this.
- Proposed environmental and other monitoring and remedial action should be given due attention.
- During the meetings, the committee should also discuss any development or potential development within the water basin, as well as the reports on monitoring and remedial action, and other relevant activities within the water basin.
- The committee should attempt to arrive at consensus, but in case this is not possible make use of normal majority-vote procedures, and accordingly make recommendations to the Water Board or, if applicable, to another responsible institution. In this process the committee should closely liaise and harmonise its position with the other institutions involved, such as the proposed Environmental commission and Land Board.
- The committee should also forward the annual assessment of the ecological health of the water basin to the same institution, together with its comments and recommendations for additional activities.
- The committee may have sub-committees.
- The members of the committee are responsible to provide funding for their own operational activities (MAWRD 3, 2000).

3. Discussions

Iterating, water resources must to be managed along hydrological boundaries and on an integrated manner. The main objective is to take water resources management and decision making to lowest possible level (subsidiary). However the type of institutions they are

must be specified. The objectives and functions have already been stipulated. The BMC will initially be advisory statutory bodies, whose main roles are to carry out strategic planning, co-ordinating, assessment and advising on management of natural resources of the basin.

As statutory bodies, endorsed in the Water Act, will report to the minister. They will develop plans in accordance with all other national plans, policies and legislation. Because of their wide range of expertise in membership, it is expected that thorough and integrated planning is carried out. These plans are coordinated by the PSU (policy and strategy unit) which will be in charge of overall national master planning and policies, and also come up with a template to be followed by all BMC when it comes to planning. This will help with consistency, although each basin has it own unique issues of concern. The plans should indicate the budget for each project and implementing agency and order of priorities. As mentioned the aim is to manage on hydrological basis and on an integrated manner.

The plans are forwarded to the minister of water for approval. On approval, they are given to the Water Resources Management Agency for implementation. Therefore, BMC will not do the actual work but identify issues for urgent implementation and monitor progress. Regional projects are included in the basin plans to avoid duplications and ensure better use of funds. The Agency will budget for the projects in the basins as indicated in the plans, and make sure they are carried out properly. Committees can solicit funds when necessary and contract out some work, in collaboration with the Agency.

So far the linkages are around the BMC (strategic planning), Water Agency (implementing plans), Regional Council (planning section as members of BMC), PSU (overall national planning and co-ordinate basin plans) and the Minister. Most of them are represent in the BMC except for the last two, but are informed at all time on what is going on. With regard to other government institutions they can be involved in carrying out some activities as indicated in the plan of actions.

The most critical issue is to make sure that these institutions are properly regulated. What needs to be addressed is the separation of regulatory and operational functions. The functions have to be clearly defined with respect to constitutional, organisational, and operational tasks and institutional arrangements. The draft Water Bill should empower the organisations in the basin to establish effective regulations and administrative and financial procedures and enforce them in line with their authority and responsibility function level. Addressing the legal issues in itself is not sufficient. Regulations, administrative rules and enforcement of powers have to be acknowledged, and accepted by all stakeholders, lawyers, and courts. For this reason, public awareness campaigns and experience exchange forums are considered important for integrated water resources management.

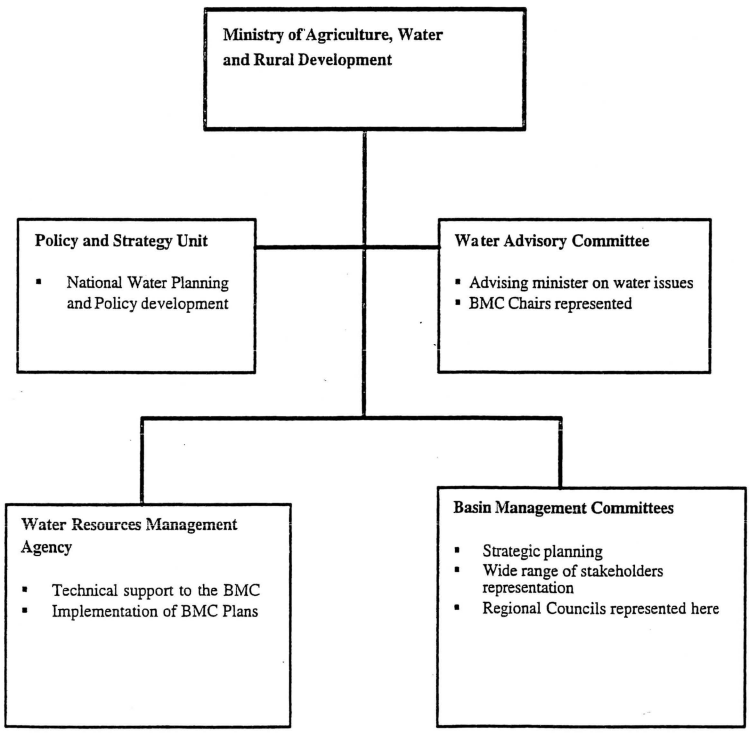

Fig. 2. Proposed structure.

The draft Water Bill calls for the establishment of BMC and its functions and membership set out. However, some of details such as funding, reporting line, power of the BMC and structure has not been stipulated. Looking at the two Australian approaches, the BMC can be either planning and advisory (NSW) or implementing (Victoria) bodies. Funding can be allocated from government, through the Agency or Regional Council. Committees can be given power to generate and retain own funds. It is important that a link between the BMC and Water Resources Agency is there not only to give technical support but also for accounting purposes as the Agency is the custodian for water resources data. For planning purpose the link with Regional Council Planning committee has been clearly stipulated in the Bill to avoid duplication. The concept of basin management is based on integrated management of the resources, therefore, other related ministries and department should be involved, mainly through stakeholders participation. Fig. 2 shows the proposed structure.

Capacity needs to be developed especially for the day-to-day functioning of the BMC's. This can be by launching an effective human resources development program, and by upgrading organisational, financial and asset management. Incentives should be given to retain and attract experienced members. Funding may come from government but also from own revenue like user fees and charges from users. BMC's must be given mandate to generate and retain own funds. However, it is essential that transparent financial procedures are used, and that committees should be held accountable to stakeholders and the public at large for the management of the assets of the water sector.

It is important that the process should not be rushed but that the implementation should proceed cautiously bearing in mind the lack of resources and capacity to effectively devolve responsibilities to the local communities.

4. Conclusions and recommendations

4.1. Conclusions

From the foregoing it is clear that, Namibia, like many other countries is making an effort to decentralise public services. This is because there is a need for improved services, economic reform and democratisation. There is also a growing need to manage water resources on hydrological basin level and to involve users and other stakeholders at the lowest possible level.

The current water sector reform initiative has produced various recommendations for an improved institutional set-up aimed at separating functions and involving stakeholders. The main one is the set-up of Basin Management Committees to carry out the management at that level. However much remains to be defined for instance how the duties and responsibilities will be shared, and how co-ordination will be arranged among institutions.

Furthermore the water law or bylaws are still to be passed, and implementation of management strategies, is sadly missing. Technical and financial support and capacity must be present at the regions, then at the communities. Other requirement of a decentralisation strategy, such as joint involvement of stakeholders in planning process, allocation or resources, autonomy to generate funds is missing.

On piloting of the Cuvelai Basin Management Committee, most of them welcome the concept and because some people have already been aware of it from the consultations on the bill, it was not hard for them to understand what they have to do. Since they are the people who live and depend on the basin resources it was important that they be in charge of its management as well. Gone are the days when decisions are made for them.

4.2. Recommendations

It has been stressed that the reason for managing water on basin level is to manage water resources better, on integrated manner and involving all stakeholders at lowest possible level. The Australian experience has revealed two possible ways to involve stakeholders. They either have full decision-making power and implementation role or simply an advisory role where they are involved in planning activities of the basins. Because of low capacity level and pending situation, the later is more suitable to Namibia. However, before progress is made to set-up such advisory committees, the followings are recommended.

- Reporting—for the reasons of empowering the BMC and as by provision of the bill and their membership to WAC, they will report directly to the Minister of Water. The main things to report on should be, their Plans as they develop them for approval, finding of the basin status through continuous monitoring and achievement as progress as they come.
- Funding—Government through the budget of the agency must provide funds to the basin. Each BMC should be allocated funds to run their every-day activities and meetings. The BMC should also be allowed to generate own funds through different means.
- Structure—The structure should allow access to the Minister. The Regional Councils are represented and present their water plans and problems. The Chairs of BMC will also be members of WAC that will meet twice a year.

- Mechanism to introduce integrated water resources management—The membership of the BMC should allow for intersectoral representation. Integrated planning has to be practised and all development within the basin has to be approved by the BMC. BMC should have power to demand plans from other sectors as they affect water resources.
- Finalise the demarcation process—This is necessary to see whether some more groupings can be made as not to have too many BMC, but still using the criteria as already specified.
- Pilot—The piloting of the Cuvelai and Kuiseb basin should continue. Awareness creation through existing structure for the targeted stakeholders, either through formal meetings, informal consultations, media (radio and newspapers).
- Establishment of sub-basin committees.
- Establishment of main BMC consisting of chairs from sub-basin committees.
- Implementation (to cover possibility to work together with Angolan counterparts).
- Monitoring.

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