

Resolving water use conflicts through stakeholder participation: Issues and examples from the Steelpoort basin in South Africa

Résoudre les conflits d'usage de l'eau par la participation des usagers :
enjeux et exemples dans le bassin de Steelpoort en Afrique du Sud

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Abstract

An ambitious process to reform water resource management is currently under way in South Africa. An important component of this reform is increased involvement of users in water management. . The belief is that greater participation will facilitate the solution of water-related conflicts in a country where water availability is increasingly scarce. This paper reports the findings of a study conducted to review the transformation in the Steelpoort River Basin, a catchment of the Olifants River , in the North-East of the country. At present, water management in the Steelpoort River Basin is characterised by local tensions and conflicts between a number of different water users, including mines, large-scale farmers, municipalities and rural communities living in areas that were classified as “homelands” under the former apartheid regime. The study concluded that meaningful participation of users in the management of water in the basin, is constrained by lack of information on the state of the rivers and water use, as well as the absence of any history of dialogue about issues relating to the management of natural resources.

***Key words:* water use conflicts, water law, user participation, South Africa, Steelpoort basin, Olifants basin**

Résumé

La participation des usagers est un élément essentiel de la réforme du domaine de l'eau en cours en Afrique du Sud. Leur implication devrait jouer un rôle clé dans la résolution de conflits locaux. Dans le cas présenté dans cet article, du bassin de Steelpoort, affluent de la rivière Olifants dans le Nord-Est du pays, tensions et conflits locaux ont été identifiés entre quasiment tous les usagers : les miniers, les agriculteurs commerciaux, les municipalités mais aussi les communautés rurales des anciens « bantoustans ». Il est suggéré ici que la mise en place d'un système d'information et que la création d'une plateforme de dialogue soient réalisés en priorité si l'on souhaite que naisse une participation significative des usagers à la gestion de l'eau du bassin.

***Mots clés :* conflits d'usages de l'eau, loi sur l'eau, participation, Afrique du Sud, bassin de Steelpoort, bassin de l'Olifants**

1. Introduction

An ambitious reform of the water resources sector is on-going in South Africa. The cornerstone of this reform is the 1998 National Water Act (NWA), which affirms that water is now a common good and the state is the custodian of this scarce natural resource. In the future, water will be allocated by taking into account 3 principles: equity, efficiency (or beneficial use) and sustainability (NWA, 1998). In short, water should become an instrument of progress and social development (Schreiner and Van Koppen, 2002). The National Water Act makes provision for decentralization in the management of water resources. At the local level, Water User Associations will be in charge of the day-to-day management of irrigation schemes. At a broader level, a Catchment Management Agency (CMA) will be established in each of the 19 Water Management Areas of South Africa. The CMA will define a strategy to manage the basin and will organize the funding of water resource management activities. One of the specific functions of the CMA is conflict resolution.

This paper describes the issues pertaining to the initial stages of the implementation this process. Particular attention is given to the eventual goal of using the new water institutions as a means of solving water related conflicts. The research

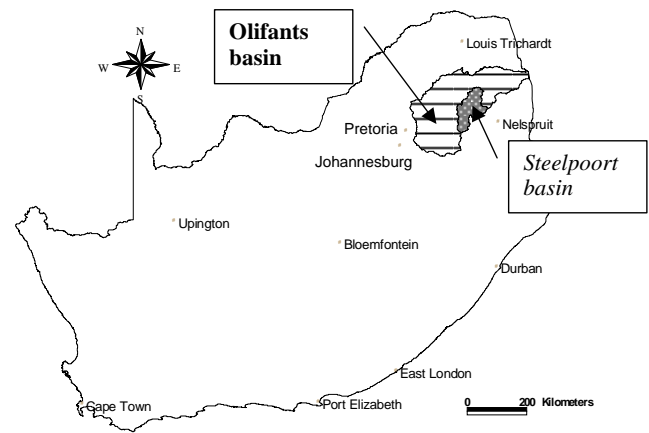


Figure 1. Steelpoort and Olifants basins in South Africa

focused on the Steelpoort River basin, which is a catchment of the Olifants River basin (Figure 1). In this basin, water resources are heavily exploited and it is anticipated that future increase in water use will lead to more problems vis-à-vis water quantity, water quality and possibly degradation of the environment. Currently dialogue between stakeholders is very limited and only a minority of stakeholders are involved.

This paper describes the water resource situation and the water uses in the basin. The current tensions and conflicts over water use are presented and a brief analysis of the elements required to facilitate negotiation between stakeholders is given. In addition, some key elements of the process of water management reform are presented and important issues that will have to be dealt with to achieve this reform within the Steelpoort River Basin are discussed.

2. A basin under mounting pressure

2.1 Resources but insufficient storage

The Steelpoort River Basin covers 7200 km², which represents 13 % of the Olifants catchment. The altitude ranges from 1500 to 2400 m above sea level. Mean annual rainfall varies between 630 mm and 1000 mm, mainly in the form of summer thundershowers (i.e. occurring between October and March). Annual potential evaporation is of the order of 2000 mm. About 350 000 people live in the catchment. 70% of them are located in the former Lebowa homeland (i.e. a tribal “homeland” established under the apartheid regime), which represents less than 20% of the total basin area (Figure 3).

The mean annual rainfall is greater than many other subcatchments of the Olifants River Basin and so in terms of water resource the Steelpoort River is relatively well endowed. The Mean Annual Runoff is 400 Million Cubic Meters (MCM) but experiences huge inter-annual differences (100 to 800 MCM) as well as intra-annual variations. The flow usually peaks in January, in the middle of the wet season, and is a minimum from June to September. Periods of zero flow have been observed in the past (Department of Water Affairs and Forestry (DWAF), 2003). An important feature of this basin is the absence of dams on the main stem of the river. Some small dams have been built (7 impoundments of more than 1 MCM), but the total capacity of storage remains limited (22 MCM). A recently completed pipeline enables the transfer of 28 MCM/yr from the Olifants River.

2.2 Growing demand

There are many diverse water users in the basin. In priority, according to the new dispensation (DWAF, 2002)

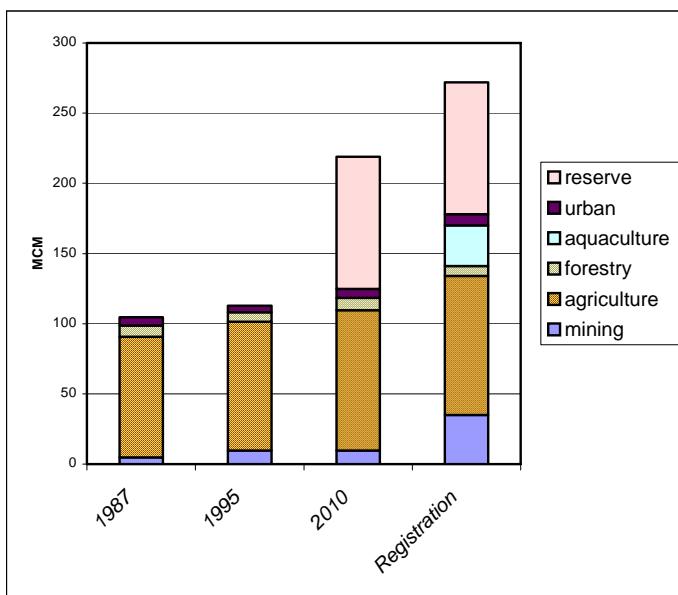


Figure 2. Evolution of the demand according to different sources (DWAF 1991 for the 1987 figure, BKS 2002 for 1995 and 2010 figures, Registration 2003).

water will be allocated to the so-called “Reserve”, representing the quantity of water required (i) to satisfy basic human needs for all people (minimum of 25 litres per person and per day) and (ii) to protect aquatic ecosystems in order to secure ecologically sustainable development (defined as the Ecological Reserve).

Main users are identified in Figure 2.

Fourteen irrigation boards provide water for approximately 8000 ha. These boards pump from the rivers, and often dig pools in the beds of the rivers, as well as

developing their own systems of storage. Livestock is important with around 200 000 units of livestock in the catchment. Most livestock are dependent on boreholes for their water. Approximately fifty mines are located in the basin, which is of exceptional geological importance. They extract a wide range of minerals and deposits: Chromium, Vanadium, Steel, Coal, Alluvial Gold, Magnesium, Platinum, Andalousite and Granite (Stimie et al., 2001). Water is crucial for the extraction and the processing of these minerals. The mines utilise both surface water and groundwater resources. It is estimated that approximately 30 % of their water requirement is obtained from boreholes. Many industries (e.g. smelters) are also present in the catchment (Stimie et al., 2001). Approximately 7000 ha of commercial forestry are located in the catchment and because of the higher evaporation rates from exotic trees; this is classified as an in-stream flow reduction activity (National Water Act, 1998). The domestic demand in the catchment comprises an urban and a rural component. The urban requirement comes from the few medium size towns located close to the main river and the principal tributaries. The largest rural demand comes from the many rural communities living in the North of the basin. The latter still depend partly on surface water for domestic purposes despite huge efforts from the government to provide boreholes. In figure 2 rural demand is thus included in the Reserve.

Different estimates of the water demand have derived over the years (DWAF 1991, DWAF/BKS/Consultburo 1999, DWAF/BKS 2002, DWAF 2002) and a new assessment is currently underway (Water Situation Assessment Model, DWAF 2003). This new evaluation will soon take in consideration declarations of water users. Indeed all users have now the obligation to declare their water use (location, purpose, quantity) through the ongoing process of Registration (RSA, 1998). Verification of the figures given by users is in progress for the Olifants basin.

In summary water demand is increasing and is predicted to increase further in the future. However, agriculture use of water is constant and may even be declining, because of internal problems within the farms and the purchase of water by the mines (figure 2¹). However, it remains the main water user with more than 50 % of the total abstraction.

¹ Registration data is still temporary: the information given in figure 2 aims only at highlighting the apparent huge increase of the demand.

There is currently a dramatic expansion of mining activity (e.g. platinum) within the catchment. The domestic demand is also increasing, with provision of potable water to all people a clear priority of the government. In

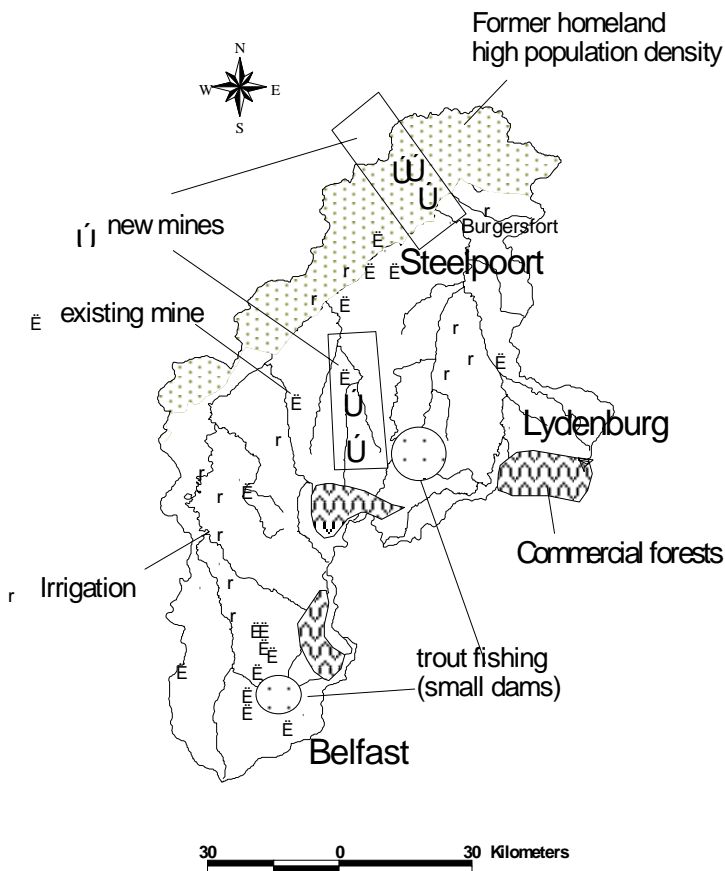


Figure 3. Sketch of the situation of the main water users (after Ardorino, 2002). The exact location of all users is not given here.

addition, according to the new law (National Water Act, 1998), two new water users must be considered: i) aquaculture (trout for fishing which leads to the building of many small dams) is now considered as a water use. In the Steelpoort catchment, dozens of small ponds have been dug to allow trout fishing and are hot spots for tourism on the road to the Kruger National Park. ii) A reservation made for the preservation of the environment This “Ecological Reserve” requires the safeguarding of flows within a river to maintain ecological integrity. In the Steelpoort it is estimated that this could represent up to 25 % of the Mean Annual Runoff of the basin (DWAF, 2002).

Currently there is enough water to meet demand in many years. However, because of the lack of water storage shortages occur, sometimes for several months, during dry years. In the last 5 years, there has not been any water scarcity. However, DWAF calculates that all currently available water will be allocated with the implementation of the Ecological Reserve. For this reason, DWAF has stopped granting new licences. However, the mines want to expand and so they have developed two strategies to circumvent the fact that no new licences are being granted. First, they purchase farmland and the water rights that go with the land. For example, in the Dwars River valley (a tributary of Steelpoort river), a mine bought a farm some years ago and was renting the land and the water to a commercial farmer (Ardorino, 2002). The mine recently decided that it needed the water for its mining activities and so ordered the farmer to stop using water. Such purchases of water right are accepted by DWAF, which simply imposes a decrease of 30% in the amount of water entitlement because of the shift in the level of delivery assurance.

Second, the Platinum mines developed, through the Lebalelo Water User Association, a pipeline to transfer water from the Olifants River. This pipeline enables transfer of 28 MCM per year and could be expanded in the future. Water was a limiting factor for the platinum development and the mines have waited for many years for approval of this scheme (SRK, 2002). Direct negotiations took place between DWAF and the mines in order to arrive at this solution (Farolfi and Perret, 2002).

2.3 Poor water quality and uncertainty in its improvement

From the middle of the basin to its confluence with the Olifants, the Steelpoort River is currently assessed as being in a “poor state” (class E) in terms of the condition of the aquatic ecosystem (DWAF/BKS, 1999). This class E is “considered to be unsustainable and ecologically degrading with unacceptably high risks to habitat and biota”. Variables of concern are numerous: EC/TDS (electro conductivity, total dissolved solids), sodium, chloride, silt (BKS, 2002) as well as heavy metals and a variety of toxins (DWAF-BKS, 1999). According to the DWAF-BKS study, mines are the principal source of water pollution. The issue of water quality is especially important because some inhabitants in the former homeland still use the Steelpoort River as the source of their domestic water (Water Services DWAF, 1998).

The monitoring and policing of the water quality situation by DWAF is hindered by insufficient allocation of resources for these activities (Ardorino, 2002). The National Environmental Management Act (NEMA, 1998) requires potential polluters like the mines to develop an Environmental Management Plan with strict obligations concerning water protection. However, at the current time water quality monitoring is very limited and in many instances DWAF has to trust the results of chemical analyses undertaken and presented by the mines.

In this context, quality objectives are set but without significant hope that they will be attained in the short term.

Because of the evaluation that any improvement in river health in the basin would be difficult to attain in the near future, the ecological class of the whole basin has been set at class D (i.e. medium ecological state). To reach the level D, will require dilution of pollutants. DWAF should monitor water quality in the future. In addition a determination of Instream Flow Requirement (IFR) has been completed and a minimum flow for each month of the year is proposed at two locations of the Steelpoort River (IFR9 and IFR10).

3. Challenges to the reform of water management

3.1 Many local tensions, but no integrating issue

Within the basin the water users perceive a wide range of problems². These problems lead to tension; defined here as resentment induced within a water user by the activities of other water users. They can even lead to conflicts, where

² This section is based on the initial work of Ardorino (2002) and De Krom (2003).

the affected user initiates a process ranging from voicing his/her complain to the accused stakeholder (directly or in a public place) to the launch of a court case.

Table 1. Existing objects of tensions and conflicts between stakeholders (after Ardorino 2002)

<i>Stakeholder</i>	<i>Objects of tensions</i>	<i>Against</i>
Commercial Farmers	Competition for water	Mines
	Pollution	Mines
	Water quality (silt), erosion	Communities
Small-scale Farmers	Pollution	Mines
	Competition	Mines
Environmentalists	Overuse of wetlands	Farmers
	Pollution	Mines
Mines	Competition for water and land	Commercial farmers Communities
Forest industry	Fees, water rights	DWAF
Municipality	Competition	Mines
DWAF	Nitrates	Communities
Villagers	Water quality	Mines
	Health problems	Other villages

There are some problems of externalities, i.e. users not getting the quantity or quality of water they are entitled to because of the actions of upstream users. In relation to water quantity, commercial farmers, some black farmers and the mines situated in the downstream part of the Steelpoort River complain about a lack of water in the dry season (i.e. winter) because of upstream users (i.e. mines and commercial farmers). The Mpumalanga Park Board, which together with DWAF, is responsible for monitoring the environmental situation, disapproves the small dams built to breed trout because they argue that these dams can harm wetlands. In relation to water quality, DWAF accuses the upstream quarries of pouring nitrates (used in explosives) into the river. DWAF, as well as some small-scale farmers, think that the settlements upstream are polluting water because of the absence of suitable sewage system and causing erosion which introduces silt into the river. One rural community is complaining that a nearby mine is polluting the air and that small particles are mixing with the water they drink.

In addition to external problems, the communities in the former homeland also face internal problems relating to both drinking water and agricultural water. They need both funds as well as institutional improvements to enable them to better manage water resources.

However, although there are many water-related problems, overall there is no overarching issue, that is sufficiently pressing to motivate the different stakeholders to initiate discussion amongst themselves, as has happened in other catchments in South Africa. For example, the water scarcity issue in Mlathuze basin or the pollution issue in the Phalaborwa region.

3.2 No history of dialogue between water users

In contrast to other basins in South Africa (e.g. the Kat River Forum, Motteux 2001 or the Upper Mlazi River forum, Faysse et al., 2003), at present there is no formal forum for gathering all water users of the Steelpoort River basin to discuss issues of common concern. .

However, two informal forums do exist. At the level of the whole Olifants River Basin, large-scale users have been meeting in the Olifants River Forum (ORF) for the past 10 years. But the activity of this forum decreased when DWAF decided that it could not be the basis for the future CMA. Second, the mines, in conjunction with the municipalities, created the Steelpoort Valley Producer Forum. This was established to discuss development activities: water supply, waste treatment, housing, etc. However, many of the issues, which cause tension between different users, are not discussed in these fora, because of the lack of activity of the former and the specific representation in the latter.

There is no agreed procedure for settlement of water-related issues. When the tension reaches the point of an open conflict, the users go to court. For example some farmers brought legal action against a mine which they accused of withdrawing too much water from boreholes close to the river. The community currently accusing a mine of polluting both the air and the water claims that this pollution has led to diseases and deaths. In this case also, a court case is proceeding. In other words, there is no “social capital” .

Therefore, the exchange of information is made between users and DWAF, not between users themselves. Because of the absence of a process to resolve issues of concern, DWAF intervenes often after denunciations come from water users anonymously. DWAF is largely considered by the water users as the main (even the only) decision-maker and so when something goes wrong DWAF is almost always the only institution solicited. Consequently attempts to resolve disputes are undertaken by the DWAF offices, which are located in Nelspruit and Pretoria, and so is a considerable distance from the basin.

More importantly, the water users do not have the same capacity to push their concerns forward. At one extreme, the Mpumalanga Park Board have just four agents to monitor the state of the environment in the whole province. At the other, the mines want to grow and are pro-active in proposing solutions to increase their access to water resources. They

have sufficient resources to finance their own studies, as well as sometimes infrastructure like the Lebalelo pipeline or the raising of dams.

Finally, while black communities are facing problems of water shortage and of pollution, their first priority is simply funds to operate their irrigation systems. Consequently they are not very sensitive to externalities created by upstream users.

3.3 A general lack of information and access to facts

With the exception of the members of the irrigation boards, the water users have no idea of the water consumption of other users. Consequently, during periods of scarcity, no explicit discussion takes place over the co-management of water between upstream and downstream users. This situation creates frustration among the downstream users.

The current water quality monitoring covers many determinants, but there is no monitoring of heavy metals concentration, which may be a serious source of pollution from the mines. Moreover, users are not aware of the results of quality assessments undertaken by the different Departments: DWAF, Mpumalanga Parks Board, etc. This lack of information dissemination leads to a situation where users are only sensitive to visible pollution (e.g. silt in the river and fumes). There is no awareness of non-visible pollution like heavy metals, which is an important issue because some people in the rural communities still drink water from the river. This lack of awareness also results in a lack of social pressure for more intensive monitoring.

3.4 Reform of the State's monitoring of users' activities

According to the National Water Act, the management of water resources by the planned CMA will have to be financed by users. The fees will be levied at a rate which is fixed by the level of assurance of water delivery. Farmers will get an assurance of supply of 70 %, compared to 95 % for the urban sector and 98 % for mining. Other users like the forestry industry will also be required to pay for their impact on downstream flows. However, commercial forestry companies are contesting this decision and arguing that other rainfed activities should also be "taxed".

The current reform of water management also aims to improve the information held by DWAF. To this end, an ongoing process of registration of all water users is being undertaken to provide a more accurate assessment of the demand. The preliminary figures obtained from the registration in Steelpoort show an unexpectedly high number of users as well as much greater total demand than was previously assumed (see Figure 2). However, it is suspected that many users have declared more than they actually require in order to secure their actual water requirement during dry periods. Conversely some users may have under-declared their requirement because it is used to determine water charges from December 2002. Although the present range of fees, from 0.015 to 0.02 R/m³ (depending on assurance of supply) seems small for large-scale users, many farmers are afraid that the rates will increase significantly in the near future. A process to verify the information obtained in the registration is currently under way. However, it is likely to be time-consuming and difficult because this is the first time South Africa has attempted such a process at the national level. In

addition, DWAF is attempting to establish a more accurate system of water quality monitoring. In the future, monitoring points will be established both upstream and downstream of those locations where pollution is potentially most likely (e.g. mines). However, DWAF is already receiving many water quality assessments made by laboratories on behalf of the mines and does not have enough human resources to verify them.

These processes will not only provide data as a basis for informed decision-making, but if made publicly available and disseminated will improve water user awareness of issues of concern. In 2002, the National Water Resource Strategy (DWAF, 2002) was presented in several meetings in all the Catchment Management Areas. However the analyses of the increased data will require more DWAF staff and the large-scale dissemination of the results is not planned yet. The lack of staff capacity may be a problem since, during the discussions about a future CMA, large-scale users made clear their desire to bring down the institution's costs as much as possible.

Finally, DWAF is also attempting to integrate activities with other government Departments. For example, the Environmental Management Programme required by both the Department of Mineral and Energy Affairs (DME, 1998) and the Department of Environment and Tourism, prior to the opening of a mine, now has to also be accepted by DWAF.

3.5 Challenges in the establishment of the new water management institutions

The National Water Act requires the establishment of Catchment Management Committees (CMCs) in sub-catchments of the Catchment Management Area. For example, there should be five CMCs in the Olifants River Basin. There should be a CMC for the Steelpoort River Basin. Therefore, in the long term, it is envisaged that users will participate in the management of the WUAs, the CMA and CMCs. DWAF is preparing for this evolution in water management structures and has recently started decentralizing its offices to the water management areas. To this end two offices have been established in Groblersdal and Hoedspruit for the Olifants River.

In the Steelpoort River Basin, it is currently difficult to get the users to participate in the CMC and the CMA, because of (i) the lack of an integrating issue that is of concern to all users, (ii) the lack of any tradition of stakeholder participation and (iii) a widespread lack of knowledge of the existence and the process of creation of a CMA. However, the overall growth in water demand and the need to cater for the Ecological Reserve will soon make more explicit the need for improved water management in the Steelpoort basin. While large-scale users will eventually join the discussion, the communities in the former homeland will need to be encouraged to participate because their perception is that internal and financial problems are currently more imperative than problems arising from externalities.

Conclusion

Management of water in the Steelpoort River Basin is a complex problem, with very diverse water uses and a wide range of issues to be addressed. The agricultural sector remains the main user, but the mines are developing rapidly and

using increasing quantities of water. The population of the former homeland is affected by issues of both pollution and water shortages. However, the highest priority for this population is funds for the development and maintenance of their water supply for drinking and farming.

At present water resources are sufficient during wet and average years. However, the growing demand from the mines as well as the need to implement the Ecological Reserve in the near future will increase the stress on water resources and may create a water deficit. It is possible that this deficit can be overcome by building a new dam (DWAF 2002). Water quality is also an important issue in the catchment.

The water users perceive many local problems pertaining to water, but at present there is no issue of common concern that will bring together all stakeholders to discuss water management. In the absence of a forum for negotiation, when water-related tensions become open conflicts, the only route open to resolve issues is via the courts.

The main characteristics of the water use in the basin are likely to change in the near future. The mines want to grow and are ready to pay much more for water than the farmers. The new system of water licences provides the government with an improved method to control water allocation and thus the type of development that will occur in the basin. Currently, on a small-scale basis, DWAF authorizes the sale of water rights from the farms to the mines. However, soon, there will be a need to decide whether the mines should be given the priority or some farming activities should be retained. In a region fast becoming an industrial area, the political choice will be difficult. At a broader scale (i.e. the Olifants and Limpopo basins which are transboundary catchments), development options are numerous. Many challenges face the Limpopo region. Tools such as Decision Support Systems able to take into account multiple criteria (i.e. ecological, economical, social) will probably have to be developed.

DWAF has established an ambitious program of reform for the management of water resources. Throughout the country, the information at catchment level is being improved through the registration of all users and the improvement of the water quality monitoring system. The success of both these initiatives is dependent on the availability of funds to sustain them. In future, this may become a limiting factor, because users, who will be required to pay for water management, are keen to keep water related charges as low as possible. In common with many other countries around the world, the long-term aim of DWAF is to effectively delegate, as far as possible, management to the users through the CMA. In the Steelpoort Basin, such an evolution will face difficulties in the short to medium term, because there is no history of stakeholder participation nor channels for the development of cooperative solutions to conflicts. The dissemination of information relating to available resources and their quality is a prerequisite for dialogue between different water users.

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