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Pond management in the Podor department, Senegal

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This article is the outcome of a research project on "local knowledge and the management of natural resources by rural communities in Senegal", conducted jointly with the Hebrew University of Jerusalem, the Free University of Amsterdam and the Université Gaston Berger of Saint Louis from 1994 to 1996, with funding from NFRP (Nederland Israël Research Project).
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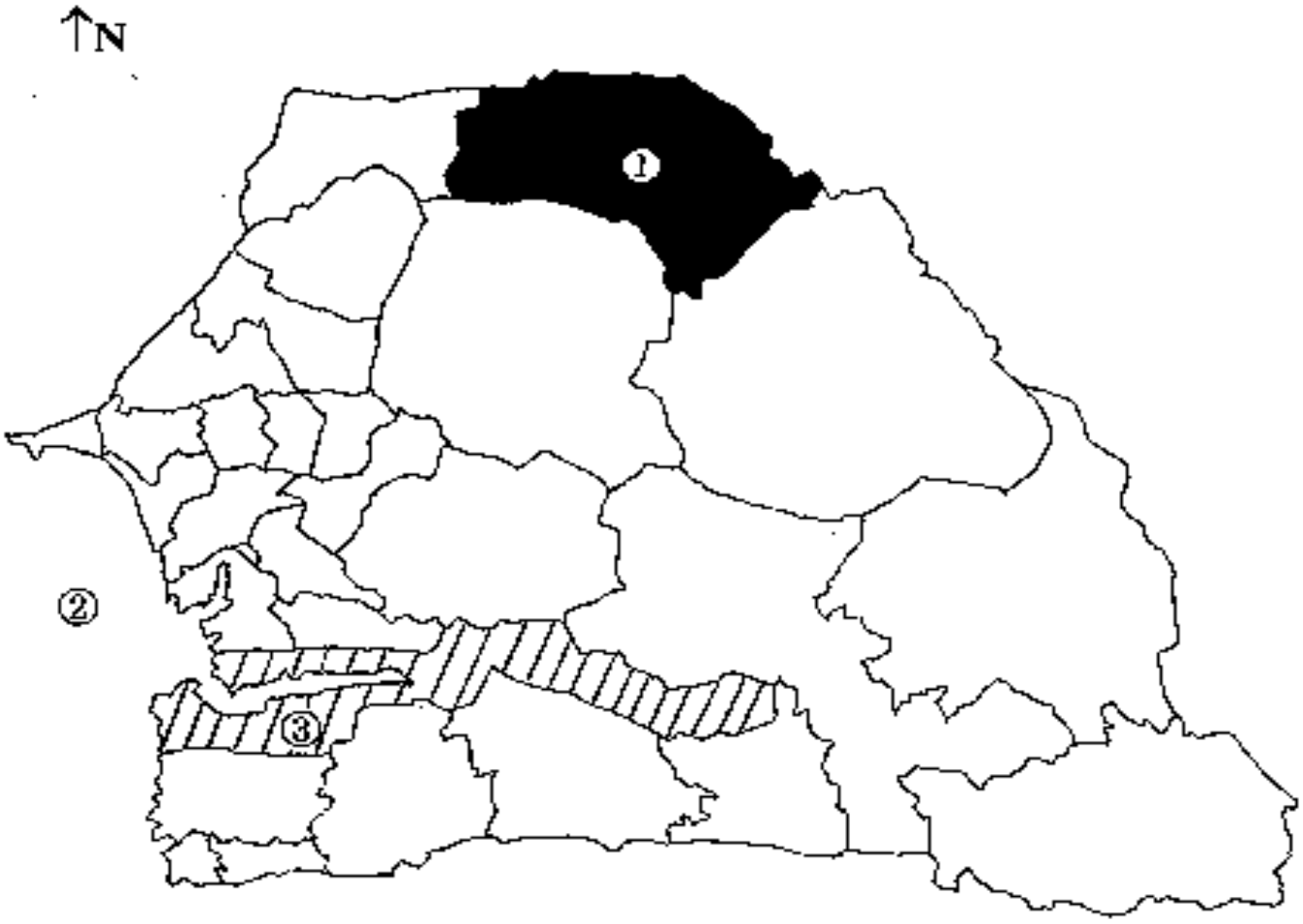
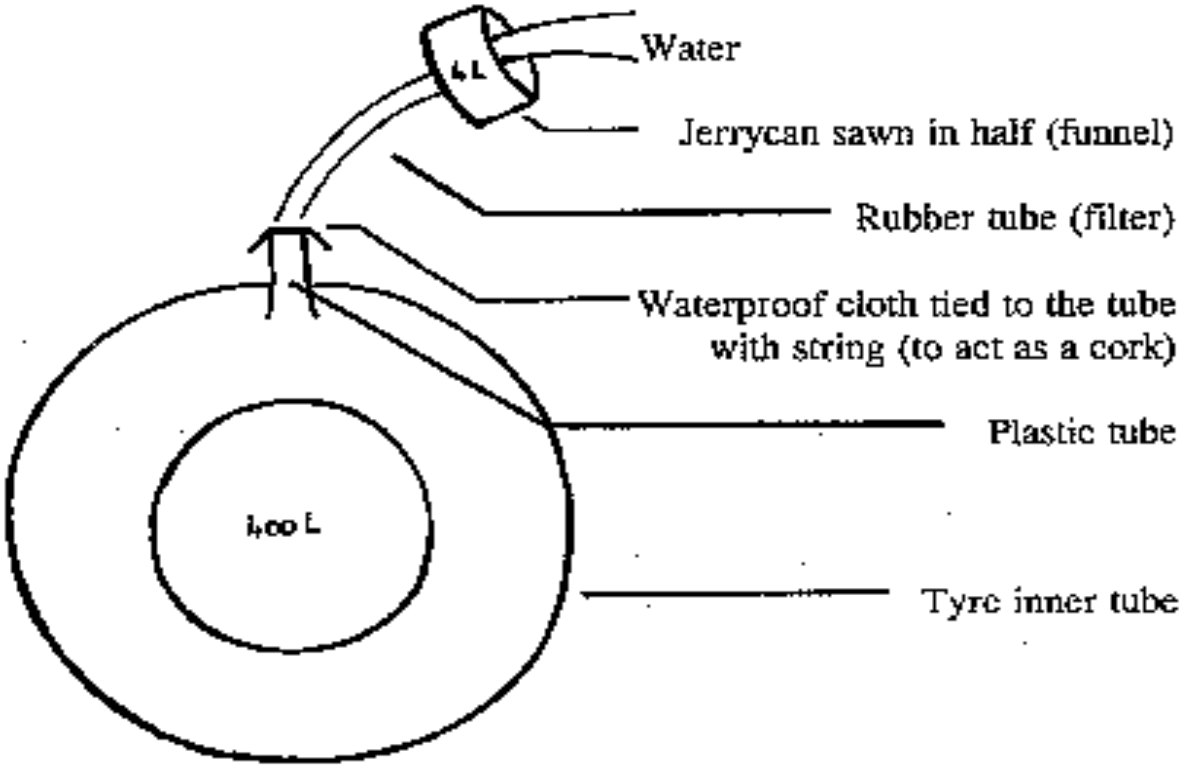
(Republic of Senegal)



Key:
① The Podor Department
② Atlantic Ocean
③ Republic of Gambia

Scale: 1:2.500.000

Diagram-1: Method of water harvesting from the ponds



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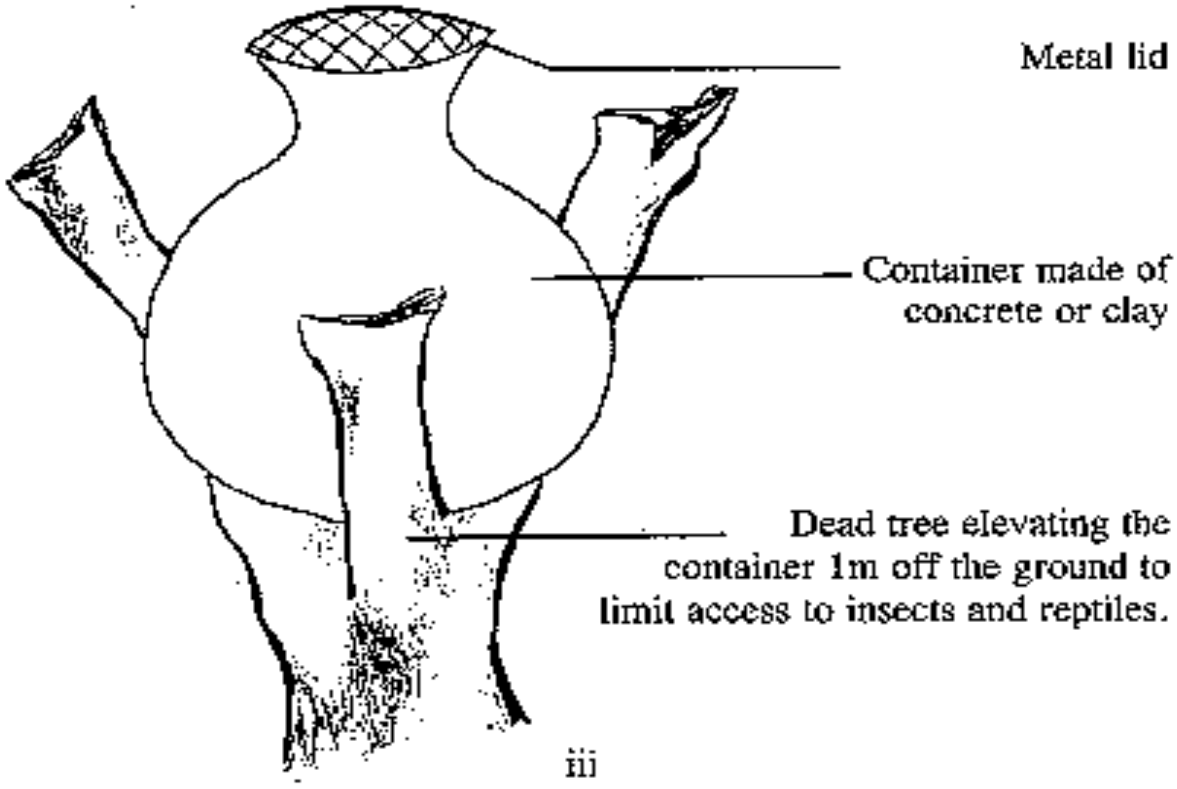

Given the conflict between the right to water and actual practice, it is reasonable to believe that the regulations governing water resources will remain a dead letter without an effort on the part of the legislators to understand local water management practices and bring the regulations into line with local circumstances, and without carefully considered action to inform, train and provide back-up for the populations concerned.

INTRODUCTION

The concept of water as the "source of life" needs to be understood in the broadest sense. Whilst water is essential to the survival of living creatures, it is also indispensable to the development of activities in the primary sector. Man must therefore achieve control over the water resources available to him in order to use them for his own ends. For this reason, the government has clearly acknowledged that "control of water resources is the sine qua non of economic and social survival in Senegal[1]". This was the rationale behind the vast programme to "supply water to the rural population", based on "the creation of one permanent water point for each grouped settlement[2]".

It is easy to see why the water-supply question is seen as an economic and social priority. The Senegalese economy is based on agriculture and is subject to the vagaries of climate. Senegal is very much part of the Sahel, a region which receives relatively little rainfall from the Intertropical Front, and the lack of water limits the development of agricultural activities. The government is committed to reversing this trend at all costs, which is why the hopes of the Senegalese economy are pinned on such hydraulic projects as the " Après-Barrage ", the " Canal du Cayor ", the " Revitalisation des Vallées Fossiles " etc. ...

Until such time as these major schemes are realised, the programme of drilling bore-holes and digging wells in the rural areas continues. This programme was of particular interest to the Saint-Louis region, where the local population had to be persuaded to stop drinking water from the Senegal River, which was causing serious illnesses. In the Podor department, however, because wells have dried up as a result of drought and a lowering of the water table, and because of the organisational and financial constraints of managing bore-holes, people have gradually returned to exploiting ponds, especially in villages remote from the river.

The Podor department lies between the "Waalo", an area well watered by the river and its tributaries, and the «Jeeri », a vast arid area. The two regions are separated by the main road east, commonly known as the "Tarmac axis". There are many ponds on either side of this line. The Waalo is characterised by clayey and muddy soils which tend to retain surface

[1] Speech to the Nation by the Head of State - 1 January 1981
[2] Statement made by the Head of State to the Council of Ministers - December 1982

water, while the Jeeri is a vast plain marked by numerous depressions. During the rainy season, surface water runs towards these depressions, where it stagnates for longer or shorter periods.

The Al Pularen populations of arable and livestock farmers and fishermen who live in the Podor department are well aware of the importance of the ponds formed in this way. They often use the ponds in preference to wells, because it takes time to draw up water from underground, especially in the Jeeri, where wells may be over 100 metres deep. They also prefer the ponds to bore-holes, since they do not have to pay to use them. However, these advantages are counterbalanced by the fact that the pond water is a short-lived resource, beginning to evaporate once the rainy season is over, and that stagnant water gives rise to health problems.

So what strategies have been developed by the institutions and population groups concerned to overcome these problems? How are the ponds managed in practice? Does the way they are managed correspond to the general objectives of achieving an economic balance, improving the living conditions of the rural population and making optimal use of natural resources? Is it in accordance with official regulations and the public interest?

This paper is an attempt to answer such questions. It is based mainly on surveys conducted in the course of a research project on *"local knowledge and the management of natural resources by rural communities in Senegal"*. The principal objective of this project was to assess the extent to which local knowledge was taken into account and rural councils involved in the management of natural resources. In this case, the way in which the local people managed the ponds was considered in the light of the existing legal and institutional framework.

THE LEGAL AND INSTITUTIONAL FRAMEWORK RELATING TO THE MANAGEMENT OF THE PONDS

Although not permanent, the ponds are an important water resource, used by the local populations for domestic consumption, agriculture, stock-raising and fishing. It is therefore necessary to examine the legal and institutional framework of water management to find out whether the importance of these ponds has been properly appreciated.[3]

Where the legal framework is concerned, we need to distinguish the Water Code (Code de l'eau)[4], the main text, from other texts which do not deal with water resources specifically but nevertheless contain related provisions.

The main text: the Water Code

In considering the Water Code, we need to bear in mind three major principles: the state ownership of water resources, the protection of water quality and priority of use.

* In accordance with the principle of state-ownership, a permit is required before a person can make use of water resources. Thus, article 2 of the Code stipulates that "water resources are an integral part of the public domain. Such resources are a collective asset and their use on national territory is subject to prior authorisation and supervision". According to article 7, permits are issued by the Ministers of Water Resources and of Land Reclamation (Ministres de l'Hydraulique et de l'Assainissement) and their purpose, according to article 8, is to "reconcile the interests of the various categories of user, taking into account previously established rights and customs and the need to conserve national water assets". The application of such provisions implies a permanent relationship between the government bodies mentioned above and user groups. However, the users are not even aware of the existence of legal provisions requiring them to obtain a permit to use water resources. In a way, the principle of state ownership is akin to traditional ideas regarding water resources, whereby water belonged to the clan or tribe as a whole, or even to the gods.

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[3] The principal texts governing the use of water rcources do not refer specifically to ponds.

[4] Law 81.13 of March 1981 JORS (Offical Journal of the Republic of Senegal) N° 4829 of 11 April 1981 pages 411 à 418.

Professor Tignougou Sanogo, a magistrate, has noted that this principle is also enshrined in Malian law: "the State is seen as the sole manager of water resources, therefore its use by individuals is subject to the issue of a permit. This would appear to be a repetition of customary law, the State having simply taken the place of the gods where the ownership of water is concerned"[5]. At the present times, the ponds are used without any reference to the State. In the mind of the village populations, they do not belong to anyone, and anybody may make use of them, no matter what his background or origin.

* The principle of protecting water quality is set out in Section II of the Code. According to article 49, it "applies to effluents, discharges, the direct dumping of substances of any kind and, more generally, to any action likely to cause or aggravate the degradation of water resources by altering their characteristics, whether surface water or ground water". In addition, article 51 clearly specifies that "water supplies must comply with the drinking-water regulations in force", regulations covering its physical, chemical and bacteriological properties. These regulations are generally a closed book to the rural populations. To prevent water for human consumption being used for other purposes which might pollute it, article 52 provides for "decrees classifying streams, canals, lakes, pools and groundwater resources according to the use to which they are to be put": human consumption, stock-raising, food production, etc... In reality, the techniques used for protecting and treating pond water tend to be traditional, based not on modern legal texts but on "knowledge handed down by the ancestors".

* The principle of priorities in the use of water resources is set out in articles 75 and 76: "supplying people with water for domestic consumption must in any case remain the first priority in allocating water resources". "When human needs have been met, priority shall then be given to stock-raising, agriculture, forestry, fish farming and reafforestation projects, then to the needs of industrial and agro-industrial businesses". But in fact the same ponds are often and invariably used for human consumption, stock-raising, etc...

The Water Code is defective in many respects, to the point where one may legitimately question its operability. The fact is that it has never been amended, whereas the situations it seeks to regulate have changed a great

[5] Droits africains. Special issue June 1989 - Page 66

deal, particularly with the building of dams. Moreover, it is always referring the reader to decrees implementing its provisions, when the decrees in question have never in fact been issued. In many ways, the Water Code is unsuitable and outmoded. The reader is forced to look in other texts for more relevant provisions in respect of water resources.

Other provisions governing water resources

Some legal texts include provisions relating to water resources, even though they are not exclusively concerned with the issue. Where ponds are concerned, we especially need to take note of the State-Ownership Code (code du domaine de l'Etat)[6] , the Environment Code (code de l'environnement)[7] and the Public Health Code (code de l'hygiène)[8]

* The State-Ownership Code defines the legal status of all inland bodies of water. These are inalienable, imprescriptible resources, the use of which is subject to a permit if such use exceeds the traditional rights to which all are entitled on parts of the State domain assigned to public use.

* Section II of the Environment Code assigns to a regulatory authority the task of regulating or prohibiting the discharging of effluents or depositing of substances into bodies or water, and of determining special protection zones to guard against pollution.

* Chapter II of the Public Health Code lays down hygiene regulations in respect of water intended for human consumption and sets out the principle that sources of water used for this purpose must not be in the vicinity of any source of pollution.

All these texts, however, are at best only partially understood by the public at large. This again raises the thorny problem of how rural populations are expected to gain access to legal information. Surely the issuing of regulations needs to be accompanied by an on-going effort to inform and train the populations concerned? We can no longer close our eyes to this problem by quoting the theoretically applicable but practically irrelevant adage that "ignorance of the law is no defence".

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[6] Law 76.66 of 28 July 1976 JORS N° 4056 of 28-09-1976 PP 1110 to 1117
[7] Law 83.05 of 28 January 1983 JORS N° 4944 of 23 April 1983 PP 324 to 332
[8] Law 83.11 of 05 July 1983 JORS N° 4960 of 06 August 1983 PP 691 to 700

There is now a wide gulf between the legal texts and actual practice. There is no sense in speaking of a conflict between two codes of law, which would imply that the populations concerned were aware of the existence of several different bodies of law and had opted for one rather than another. The fact is that the rural populations in the Podor department are not even aware of the existence of modern legal provisions relating to water resources.

As a water resource, ponds are unusual because of their temporary and impermanent character, and because they present certain dangers for the health of animals and humans.

Specific, suitable provisions therefore need to be introduced, to give a precise definition of the responsibilities of the institutions charged with their management.

The main institutions involved in managing the ponds

Who manages the ponds in actual fact? Who should be managing them according to the water regulations? The answer to the first question is relatively [simple?]: in practice, the ponds are managed by the village folk. The answer to the second question is more complicated, as the legal texts do not clearly determine who has official authority over pond management. It may help to make a distinction between the "deconcentrated" services[9] run by the State and the rural communities.

The State-run services

Water resources are part of the public domain and must therefore be managed by the State and its various agencies. For instance, the Public Health Service has the task of visiting villages in Senegal to clean up water resources which present a risk to health. In actual fact, however, although the agencies concerned with public health, water resources and the environment do have a responsibility in this area, the State takes no part in managing the ponds. One really wonders if the people responsible for implementing the legal texts are in fact aware of their contents. This situation is regrettable as the phenomenon of "personalisation" is very common in the rural areas: one may not be familiar with the texts, but one knows the heads of the various agencies and listens to what they say. By

[9] The "deconcentrated" services are under direct central-government control. They are managed by agencies appointed by central government (and are therefore not elected by the local people, as in the the case of "decentralised" structures).

taking advantage of this circumstance, representatives of the State and its services could play a decisive role in making the content of the texts known and ensuring their implementation.

The rural communities

According to the provisions of the new Local Government Code (code des collectivités locales) as it affects rural communities[10], "the rural council shall deliberate on an matter over which it has been given jurisdiction in law, and in particular on the system and methods whereby water points of any kind are accessed and used...". However, the rural councils do not get involved in managing the ponds, either. In view of the current trend towards decentralisation, there is a need to give clearer definition to the powers of local elected bodies as regards the management of natural resources. There is confusion as to whether they should they be managed at regional level or by the rural communities themselves.

Even though the regional authorities are endowed with significant powers when it comes to managing water resources, it is difficult to see how managing the ponds, which - given their size - is often purely a village matter, could be anything but the responsibility of the rural communities themselves. In any case, as things are organised at present, the region is responsible for planning and development, while the communes and local authorities undertake the day-to-day management tasks.

There is no escaping the fact that the main actors in the development process - State, Local Authorities, NGOs, Foreign Organisations - have not realised the growing importance of the ponds in the Podor department. This is despite the fact that they are a valuable resource and, for certain villages such as Lombol Barodé, Mbélogne or Togane, the only water resource used for both human consumption and productive purposes.

Management is therefore carried out purely at village level, and for this reason it is essential to understand the local techniques used for managing the ponds in the Podor department. Here again, there is a great gulf between actual practice and legal stipulations.

[10] Law 96.06 of 22 March 1996 JORS of 22 May 1996

TECHNIQUES USED BY THE VILLAGE PEOPLE IN MANAGING THE PONDS

The conflict between the texts and actual practice should not in any case be allowed to lead to a ban on the village pond-management techniques, which demonstrate a determination to adapt to the constraints imposed by drought conditions. In some cases, one might even question whether it is the village practices that need to be brought in line with the texts, or the texts that should be amended to meet the specific social needs of the situation. Of course, this debate could have been avoided if, instead of drawing on the experience of countries socially so different from our own, the texts had been drawn up to take account of the immediate cultural circumstances of the situations requiring regulation. As well as being a closed book to the local populations, most of the texts are also quite inapplicable.

Traditional practices are evident in the techniques used to protect the environment of the ponds, and also in the way in which the ponds are exploited. How are we to understand these practices? And in what respects do they not comply with the texts?

Protecting the environment of the ponds

The villages in the Podor department have shown an increasing concern for protecting the environment, spurred on by the damaging effects of drought and by extension campaigns organised by developmental agencies in the region. Where the ponds are concerned, the villagers' efforts are directed mainly towards maintaining the vegetation cover and establishing a protective barrier around the ponds.

Maintaining the vegetation cover around the ponds

How long the pond-water lasts depends on the amount of rainfall and the volume of water contributed by the River and its tributaries in time of flood. It also depends on the extent to which the ponds are exposed to sun and wind. Two techniques are being used to slow down the process of evaporation and, if possible, encourage the accumulation of water. One is passive and consists in prohibiting tree-felling in the vicinity; the other is an active policy of tree-planting.

The local people are aware of the importance of tree cover in reducing the rate of evaporation and lengthening the life of the ponds, and so have

formally undertaken not to fell trees. Shrubs, for their part, act as wind-breaks and so limit the erosion and silting up of ponds in an area where wind plays a major part in shaping the landscape. At Wouromalé, a village in the rural community area of Gamadji Saré, a strict watch is kept on the local ponds, in order to maintain the surrounding vegetation. Elsewhere, in Burkina Faso for example, a country which has made much progress in water regulation, a system of small anti-erosion dams has been introduced: depressions which capture surface water are cemented and enclosed to prevent the water from seeping away into the ground and counter the erosive effects of exposure to wind.

The second technique resulted from observation of the effects of wind erosion. It consists in fighting against accumulations of sand which would otherwise prevent water from reaching the depressions and forming ponds. To prevent this from happening, the local people plant trees on the banks of streams and ponds, which helps stabilise the soil. At Lidoubé, another Waalo village in the rural community area of Gamadji Saré, planting trees in this way has improved the flow of water from tributaries of the River to the ponds. These very simple, cost-effective techniques certainly do not feature in the texts relating to water resources. Instead, the authors mention procedures which are beyond the means of the populations concerned. People will make even more determined efforts to protect the ponds when they represent a vital water resource: in some village of the Jeeri, where ponds are the only source of water available, efforts are made to surround them with a protective barrier.

Creating a protective barrier around the ponds

When the water of a pond is intended exclusively for human consumption, it generally receives special protection. This consists in surrounding the pond with a barrier of dead wood and uprooted spiny shrubs to prevent animals from approaching and guard against foreign bodies which might otherwise pollute the water. This has been done at Togane, a Jeeri village in the rural community area of Guédé-village, even though the barrier in question has not altogether prevented goats and horses from reaching the pond.

This technique is in keeping with the provisions of the texts referred to earlier, which encourage villagers to create a special protective barrier around sources of drinking water and keep likely pollutants away from water used for human consumption. It is interesting that current practice sometimes coincides with the regulations, even though the local people are

quite unaware of the texts concerned. Once afforded protection, these ponds are exploited for various purposes.

Exploiting the ponds for domestic purposes

We need to make a distinction between exploitation of the ponds for domestic consumption, which we shall refer to as social use, and their exploitation for productive, i.e. economic, purposes.

Social use of the ponds: the role of women

These techniques are concerned with fetching, storing and treating the pond water. When a pond is several kilometres from a village, special equipment is used to fetch the water. This is generally a cart pulled by two or three donkeys and, mounted on it, a tyre inner tube holding up to 400 litres. An inner tube of this kind costs between 7 and 30 thousand francs CFA. To fill the inner tube, the women use a rubber tube sold on the market at 600 francs CFA per metre and an empty 4-litre jerrycan, which costs 250 francs CFA. One end of the tube is inserted into the inner tube, while the other receives the spout of the jerrycan, which has been sawn in half to form a funnel (see Diagram-1). At Diarni, in the Jeeri, the women leave early in the morning to fetch water from the ponds, not returning until late in the evening. The time taken to fetch water, especially in the villages of the Jeeri, prevents the women from taking part in literacy campaigns or training, or engaging in productive activities.

The water fetched in this way is then stored on the family's property, partly in steel drums for the domestic animals left in the village, partly in water tanks, on which a careful eye is kept, for human consumption. To prevent animals from getting at them, these tanks are raised one metre off the ground on a dead tree trunk (see Diagram-2). When water is scarce, the tanks are kept in a secure hut and carefully managed by the women to avoid wastage.

The women are generally aware of the poor quality of stagnant water, especially when it is stored in unsuitable conditions or kept for too long. For this reason, some women try to treat the water before it is used for human consumption. There are two aspects to this treatment: decanting and disinfecting. As part of the decanting process, the women pour "Yarlem", a kind of salt sold on the weekly market, into the water tanks, or use the leaves or bark of the "Guidjili" tree. But decanting does not rid the water of

microbes. For this purpose, they use the leaves of the "Nivaquine" tree *Azadirachta indica* or of the "Murtoki" *Balanites aegyptiaca.* When asked why they did not use chlorinated water, some villagers answered that they had not the money to buy it, while others said that it altered the "taste" of the water or was dangerous because it destroyed the "intestines", just as it would damage a garment on which some was spilt.

In practice, then, only traditional treatment methods are being used to fulfil the requirement of ensuring that water is of drinkable quality as defined in the legal texts, in particular article 51 of the Water Code and article L8 of the Public Health, before it is consumed. However, there must be some doubt as to the effectiveness of these processes since they are powerless to control such water-borne diseases as bilharzia, onchoceriasis, diarrhoea, etc.

The drinkability criteria - physical, chemical, biological and bacteriological standards - set out in the texts referred to earlier are technically incomprehensible to rural people, very few of whom have attended school. These are the realities that the legislators need to take into account when framing the texts, as laws should never be divorced from the circumstances they are intended to regulate. In many cases, even traditional treatment methods are neglected and people are driven to drink what little water they can find, just as it is, simply to survive another day. Deficiencies in water management are also apparent when we turn our attention to the exploitation of the ponds for productive purposes.

Exploiting the ponds for productive purposes

Fishing in the ponds has been in decline since the 1970 drought. There are very few ponds in which the water remains for more than two months after the rainy season. Fish therefore rarely find a congenial environment for reproducing themselves.

There has been little agricultural development in the vicinity. This is evident at Alwar in the rural community area of Gamadji Saré, where only a few vegetables are grown around the ponds. Most crops of this kind are planted in irrigated areas, on the banks of the river or in the women's gardens.

On the other hand, the ponds are much used by stock-raisers. For watering animals, they have definite advantages over other sources. The villages of the Haut-Jeeri are a long way from the river and livestock holders will

cover tens of kilometres to find water in the Waalo. This is true of villages such as Tiaklé, Torobé, Petel Diegués, Alana... Therefore, when the ponds fill up in the rainy season, livestock farmers and their animals settle around them.

The disadvantage of wells is that the water is difficult to draw, making it a costly exercise in time and energy for the women. According to the livestock farmers, the water from bore-holes is expensive: 10 to 15 FCFA per head per month for sheep and goats and 50 to 75 FCFA for cattle. When the ponds are full of water, bore-holes are less in demand and the herdsmen have two or three times less work to do than in the dry season. But the ponds also have their disadvantages. The livestock diseases which are very prevalent in the Podor department can be ascribed in large part to the consumption of pond water, which is a prime breeding ground for the larvae concerned.

Use of the ponds by pastoralists also gives rise to environmental problems. The ground around the water points is trampled and manured by the livestock, and the human population often draws water from the same source. This is the case at Togane in the rural community area of Guédé-Village, even though the people of this village are well aware of the need to afford extra protection to ponds whose waters are used exclusively for human consumption.

CONCLUSION

Finding, regulating and managing water resources are the main concerns of the populations living in the Podor department. There, as elsewhere, the water question is extremely delicate as it raises a public health problem and affects every sector of the rural economy.

The ponds are not managed in any formal way. There is no committee of the kind set up to manage wells or bore-holes. Access to the ponds is free for all, whether resident or not. According to the local population, the absence of conflicts over the use of the ponds, despite the lack of water, is simply a matter of natural solidarity.

From our observation of the situation, we would like to make a number of recommendations as to how the ponds could be better managed in the public interest and with regard to public health.

The regulations governing water resources should include specific provisions for the management of the ponds, taking into account their special character, so that the water can be conserved and hygienic arrangements encouraged.

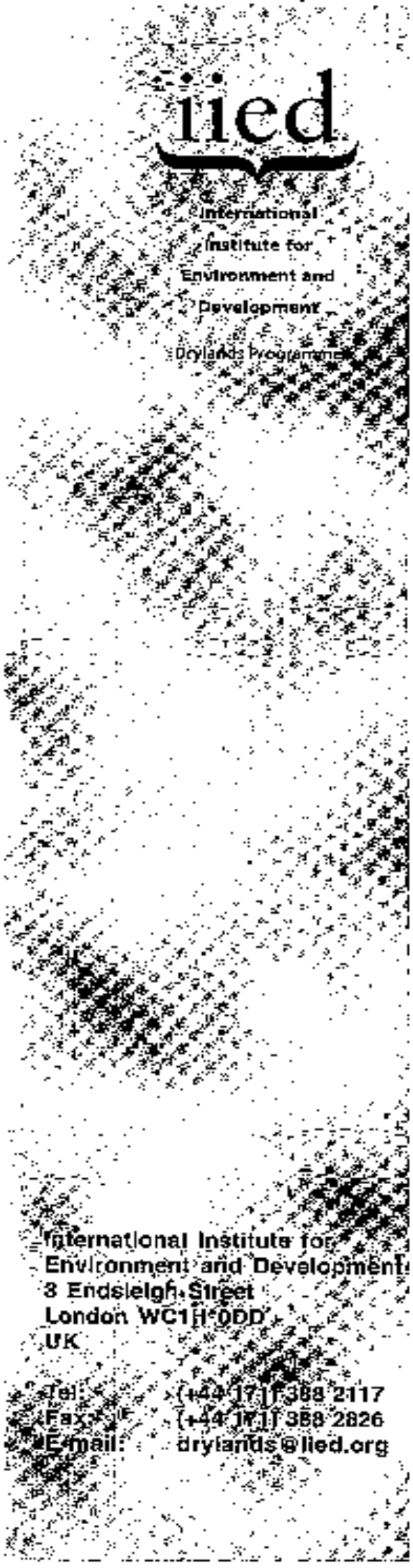
It is also desirable that, as part of their information and training programmes, the various parties involved in the development process make it a priority to disseminate rules of good hygiene. When all is said and done, no development initiative is viable if it does not at least safeguard public health, and prevention is better than cure.

Until such time as alternative arrangements are adopted which are more in line with the current public health regulations, it is vital to encourage and pursue the local protection techniques and to improve and modernise the water treatment techniques used in villages where the ponds are the only water resource.

- The role and powers of the rural communities need to be clarified where this issue is concerned. Rural counsellors might then encourage the setting up of committees to manage the ponds. The task of such committees, carried out on behalf of the local populations and supervised by the rural counsellors, would be to control access to the ponds, safeguard public health, and ensure that the ponds were exploited to the best possible advantage.

- Finally, and more generally, there is a need to rewrite the legal texts relating to water resources to bring them into line with local circumstances. It is essential that this be accompanied by measures to organise and train the population groups to whom the texts are addressed.

These are vital requirements: not only do they affect economic development; they are essential for public health.



The Drylands Programme aims to contribute towards more effective and equitable management of natural resources in semi-arid Africa. It has built up a diverse pattern of collaboration with many organisations. It has a particular focus on soil conservation and nutrient management, pastoral development, land tenure and resource access. Key objectives of the programme are to: strengthen communication between English and French speaking parts of Africa; support the development of an effective research and NGO sector; and promote locally-based management of resources, build on local skills, encourage participation and provide firmer rights to local users.

It does this through four main activities: collaborative research, training in participatory methods, information networking and policy advice to donor organisations within the framework of the Convention to Combat Desertification.

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