CHAPTER 7

African aquatic weeds and their management

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Detailed contents

7.1 Definition and nature of aquatic weed problems

7.1.1 *Definition*

The simplest definition of a weed is a plant that is a nuisance. Thus, an aquatic weed is an aquatic plant which interferes with the use of water, or in some other way constitutes a nuisance to man or hazard to human welfare. However, in contrast with single purpose systems such as an agricultural crop in which weeds are readily identified as such, water bodies frequently have more than one use, and assessment of the weediness of a plant may be confused when it interferes with one use, such as navigation, while promoting another, such as fish production (Mitchell, 1974, 1978). The value judgments made in these situations are often one-sided and based on incomplete understanding of the nature of the system, the role of the plants in it and the long-term implications of the relationships involved in these situations. Sometimes, as in the case of *Eichhornia crassipes* in the Nile (see section 7.2.2) or *Salvinia molesta* on Lake Kariba (see section 7.2.5), there is general agreement that the plants in question are weeds, though it should be noted that even the most detrimental plant invasion can have some benefits and that adjustments to problems that are intransigent or too expensive to control are always possible.

In other situations opinions may differ markedly

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and assessments are controversial. For example, proposals have been made for the use of the water in the Okavango Swamps for agriculture and mining in Botswana. Alternative sources of water are not available (most of the country is semi-desert), and the importance and value of the water is unquestionable. Water balance studies indicate that large volumes of water entering the swamp through the Okavango River are dissipated by seepage (perhaps promoted by seismic activity) or by evapotranspirative loss (Thompson, 1974). Both are notoriously difficult to measure, and in the absence of reliable data it is very tempting to advocate the removal of some of the vegetation in order to cut down on water loss. (That this may have the opposite effect, as explained in section 7.3, is seldom appreciated.) Consideration also has to be given to the value of the Okavango Swamps to the climate, tourist potential and wild life of Botswana. In such situations a balanced assessment of the weediness of plant populations is very difficult and decisions are consequently usually made on a socio-economic basis with little regard to ecological considerations. Thus the excavation of channels to drain water from the swamp for various purposes avoids assessment of the effect of the plants on water supply (and probably leads to their ultimate demise anyway).

In general, a useful guide to sound assessment may be obtained from consideration of the normal distribution of the plant in question. If it is native to the area where it is causing a problem, there have to be good reasons for considering it a weed and any proposal to control the plant will have to take account of the probability that its weediness is very localised and that re-invasion will occur from uncontrolled populations nearby. For example, emergent swamp plants which may colonise an irrigation channel and interfere with flow in the channel are clearly weeds in that situation. However, the same plants in a swamp being managed as a nature reserve in the vicinity cannot be considered weeds. In such a situation, control methods for the plant in the irrigation system will obviously need to be confined in their effect to the channel or drain being treated. By contrast, the presence of a plant that is alien to the area could be treated as a potential weed even before it causes problems and drastic measures aimed at its eradication would be justified, especially if it is one of the species, such as *Eichhornia crassipes*, which is known to be a widespread problem. In such a situation the assessor is in the position of having to justify why the plant is not considered a weed and handled accordingly.

Normally a proper and full assessment of the weed status of an aquatic plant in a particular situation requires that rigorously collected, quantitative data of an ecological as well as a socio-economic nature be obtained. This must be objectively examined and a decision reached that is justifiable and open to continuing re-examination as the situation changes, as set out in section 7.6 (Mitchell, 1979*a*, 1979*b*).

7.1.2 *The nature of weed problems*

Aquatic weeds cause a variety of problems in Africa that are broadly similar to those caused by aquatic weeds elsewhere in the world as described by Guscio *et al.* (1965), Holm *et al.* (1969), Little (1968, 1969) and Mitchell (1974, 1976, 1978). In Africa, aquatic weeds interfere with water flow in rivers, canals and drains, thereby imperilling irrigation schemes and slowing drainage of water from floodlands; impede the movement of boats for transport, fishing and recreation; interfere with various methods of catching fish; compete with rice in paddy systems; degrade water quality by adding taints and odours to the water and by decreasing dissolved oxygen content; alter the flora and fauna of aquatic ecosystems by providing new habitats, removing others and by affecting the light climate in the water; favour the spread of diseases such as malaria and schistosomiasis by providing habitats for the intermediate vectors of the parasites causing these diseases; threaten engineering structures such as bridges, weirs and devices to control and measure water flow, especially when large mobile mats of aquatic vegetation move around the water body; block pump intakes; impair the access of stock and wild life to drinking water; decrease the capacity in usefulness of a reservoir by occupying useful volume and by increasing water loss through evapotranspiration, although these effects are