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CHAPTER ONE

PEOPLE-CENTRED WETLAND MANAGEMENT

By Adrian Wood, Alan Dixon and Matthew McCartney

[a]Introduction

Wetlands have played a critical role in the livelihoods of people in Africa for millennia, not least because they have been sources of food and water for people living in often dry and semi-arid environments (Scoones, 1991). Indeed, much has been made in the literature of the last 30 years of the capacity of wetlands to provide a diverse range of functions and services which have supported people, ecological systems and the physical environment (Maltby, 1986; Dugan, 1990; Davis, 1994; Barbier et al, 1997; MA, 2005). Yet as explored throughout this book, the functional relationship between wetlands, people and livelihoods, and indeed the very survival of people, has tended to be neglected in the global hegemonic discourse of wetland management that has largely been driven by environmental concerns (Melamed et al, 2012; Matthews, 1993). While the effect of this discourse in Africa has been a growing awareness of the environmental importance of wetlands among policy makers, a persistent view has developed that local people constitute the principal agents of wetland destruction; for example the transformation of wetlands by drainage for subsistence agriculture has, and continues to be, regarded in many places as unacceptable (see Chapter Seven). Consequently, as will be discussed later in this chapter, many wetland policy and management initiatives have sought to largely exclude potentially 'destructive' farmers and pastoralists.

This book, however, argues that such policies are no longer acceptable or relevant in the light of the challenges for human development and livelihood security facing Africa in the 21st Century (FAO, 2011, UNDP, 2012a). Rather, it is argued here that peoples' use of wetlands for multiple sustainable benefits, of an economic, social and environmental nature, must be the main focus (Howard et al, 2009). The majority of Africa's population (estimated to be around 1 billion) continue to live in rural areas where a life of smallholder subsistence agriculture, and a lack of access to basic needs, such as food and water, have

entrenched many people in poverty (Binns et al, 2011). Despite some progress towards achieving the Millennium Development Goals (MDGs), recent statistics suggest that food insecurity and under-nourishment continues to rise and this will remain a major challenge not least because of population growth (FAO, 2006, 2011; UNDP, 2012b). It is estimated that 239 million people are undernourished in Sub-Saharan Africa (FAO, 2011) and around 340 million people across the continent (the majority of whom live in rural areas) continue to lack access to safe drinking water (UNICEF, 2006). Reports from the Intergovernmental Panel on Climate Change (IPCC) and more recent scientific studies, suggest that climate change across the continent is also likely to compromise food security and agricultural livelihoods due to changes in growing seasons, increased rainfall variability and water shortages (Boko et al, 2007; Lobell et al, 2008; Muller, 2009).

These are the issues that must be addressed, and as this book argues emphatically, wetlands have a critical role to play in supporting *and* developing peoples' livelihoods, reducing poverty, improving food security and, in the wider context, contributing towards sustainable development. We do not advocate the indiscriminate exploitation of wetlands but rather a balanced approach that seeks to optimise benefits for poor rural populations and simultaneously safeguards vital ecosystem services. In this book, we present a number of case studies from around the continent which: a) illustrate the contribution that wetland benefits, especially agriculture, can make to peoples' livelihoods and well being, and b) incorporate ideas, concepts and initiatives that have sought to facilitate win-win outcomes in wetlands for both the environment and development. In this way, the book seeks to reconceptualise wetlands as natural resources within the discourse of sustainable development, and hence reposition the wider wetland management debate away from environmental management with development outcomes, to one of livelihood development based on the sustainable use of these resources which inherently ensures positive environmental outcomes. Consequently, the case studies draw, in particular, upon concepts and ideas that have emerged from the development and natural resource management literature, such as community based participatory approaches, common pool resources, social and ecological resilience, integrated water resource management and catchment planning, and critically the concept of a sustainable livelihood itself. These are applied

primarily to small inland wetlands in different parts of the African continent where small-scale agriculture is a major contributor to rural livelihoods.

In this chapter we provide an overview of the wetlands discourse of the last 60 years, as well as identifying other areas of thinking which can contribute to taking this discussion forward. The nature of wetlands and the ecosystem services they provide, especially as contributions to African livelihoods, are reviewed in the first part of the chapter. The wetland discourse and the relevant thinking from the development agenda are reviewed in the next two sections, exploring how different schools of thought and concepts have contributed to the thinking on wetlands, and can inform current wetland debates. The chapter concludes with a focus on recent thinking about wetlands and proposes a framework for a “people-centred approach for analysing the management of small inland wetlands in Africa”. The aim of this wide-ranging introduction is to ensure readers of different experience and interests are introduced to the diverse thinking and ideas which have been, and could be, relevant to ensuring that wetland management contributes to sustainable livelihood development in Africa.

[a]Wetlands and ecosystem services

Wetlands are diverse environments, both spatially and temporally, and also in terms of their physical size, ecology, hydrology and geomorphology. Whilst a myriad of literature presents and debates the definition and characterization of wetlands in different environments, along with their associated functions (Dugan, 1990; Roggeri, 1995; MA, 2005; Maltby and Barker, 2009), the most widely accepted scientific definition for conservation and planning purposes continues to be that established by the Ramsar Convention in 1971. This definition embraces the diversity of wetlands by grouping together a wide variety of landscape units whose ecosystems share the fundamental characteristic of being strongly influenced by water:

‘...areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.’

(Davis, 1994, p3)

Subsequently the Ramsar Bureau developed a classification of 42 distinct wetland types (Davis, 1994) although it later simplified these into five broad categories:

**marine (coastal wetlands including coastal lagoons, rocky shores, and coral reefs);

**estuarine (including deltas, tidal marshes, and mangrove swamps);

**lacustrine (wetlands associated with lakes);

**riverine (wetlands along rivers and streams); and

**palustrine (meaning “marshy” - marshes, swamps and bogs)

(Ramsar, 2009)

All of these types of wetland are found throughout Africa, and estimates suggest that they constitute somewhere between 1% and 16% of the total land area of African countries depending upon whether the larger lakes are included within this classification (Hughes 1996; Shuyt, 2005; Rebelo et al, 2010). This is likely to be an underestimate, however, since the data on wetlands is far from comprehensive due to inconsistencies in the wetland terminology used, the neglect of small seasonal wetlands and the logistical constraints of carrying out surveys (Denny, 2001).

The occurrence of wetlands (Figure 1.1) reflects the variation in climate and geomorphology, and Denny (1993) identifies two broad physiographic units; ‘low Africa’, situated to the north and west, which is composed of sedimentary basins and upland plains below 600 m a.s.l. and favours the formation of floodplain wetlands; in contrast, ‘high Africa’ to the south and east, which can be characterised by the results of tectonic activity, includes extensive mountainous areas, deep valleys and highland plateaux. Within the latter, lakes and swamps tend to be the more abundant wetland features.

Figure 1.1 *Distribution of Wetlands in Africa* (adapted from MA, 2005)

Much has been written about the value and functions of wetlands (Dugan, 1990, Barbier, 1993, Roggeri, 1995; MA, 2005; Maltby, 2009; Maltby and Barker, 2009), and as greater

understanding has emerged of the role wetlands play in ecological and hydrological cycles, there has been a concurrent shift in attitudes away from wetlands being viewed as unproductive wastelands, to one of wetlands as multifunctional resources. The multifunctional nature of wetlands has most recently been conceptualised in the Millennium Ecosystem Assessment's classification of 'wetland ecosystem services' which stresses how they contribute to human well-being and poverty alleviation (MA, 2005: p1). The range of ecosystem services (ESS) that wetlands can provide, either in their natural state or when partially transformed, are highlighted in Table 1.1. Many ESS, especially provisioning ones, have direct economic value to people, while regulating and support services in general help maintain environmental functions which are of benefit to communities. Wetlands also provide ESS which have other, cultural, values for communities, especially with respect to spiritual, recreational and aesthetic interests. In addition, wetlands have biodiversity values which have been a key element in the discourse about the management of these areas. Different societies under different socio-economic, cultural and development conditions value these ESS differently and this adds to the diversity which needs to be recognized when discussing wetlands.

Table 1.1 *Ecosystem services provided by, or derived from, wetlands* (adapted from MA, 2005)

Services	Comments and examples
Provisioning	
Food	Production of fish, wild game, fruits and grains
Freshwater	Storage and retention of water for domestic, industrial and agricultural use
Fibre and fuel	Production of logs, fuelwood, peat and fodder
Biochemical	Extraction of medicines and other materials from biota
Genetic material	Genes for resistance to plant pathogens, ornamental species. etc.
Regulating	
Climate regulation	Source and sink for greenhouse gases; influence local and regional temperature, precipitation and other climate processes
Water regulation (hydrological flows)	Groundwater recharge / discharge
Water purification and waste	Retention, recovery and removal of excess nutrients

treatment	and other pollutants
Erosion regulation	Retention of soils and sediments
Natural hazard regulation	Flood control and storm protection
Pollination	Habitat for pollinators
Cultural	
Spiritual and inspirational	Source of inspiration; many religions attach spiritual and religious values to aspects of wetland ecosystems
Recreational	Opportunities for recreational activities
Aesthetic	Many people find beauty or aesthetic value in aspects of wetland ecosystems
Educational	Opportunities for formal and informal education and training
Supporting	
Soil formation	Sediment retention and accumulation of organic matter
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients

The MA also makes it clear that not all wetlands support the full range of ecosystem services. Specific services are associated with particular types of wetland in specific ecological and geographical settings as well as the ecological condition of the wetland. Because of the complexity of natural systems it is often difficult to predict the exact nature and the magnitude of services that any given wetland provides. With respect to hydrological regulating services, research has shown that these wetland services are not as widespread as once thought (Bullock and Acreman, 2003).

[a]Wetlands, livelihoods and Sustainability in Africa

[b]Wetlands and Livelihoods

In general, it is in their capacity to provide what the MA (2005) calls ‘provisioning services’, that African wetlands arguably make the most important direct contribution to peoples’ livelihoods. In particular, wetlands have been a critical source of food, fresh water, fibre and fuel, in many of the most marginal areas of Africa for centuries (Trapnell and Clothier, 1937; Gluckman, 1941; Hollis, 1990; Scoones, 1991). This relationship between communities and wetlands continues today as provisioning services are increasingly developed, and as wetlands play ever more important roles in livelihood diversification in the face of

challenges to traditional livelihoods emerging from population growth and climate change. In northern Nigeria, for example, seasonally flooded low lying areas known as *fadamas* support the livelihoods of hundreds of thousands of smallholder farmers (Dan-Azumi, 2010, Chapter Nine). Similarly throughout central and southern Africa, seasonally inundated *dambos* are common landforms that provide a reservoir of soil moisture during the dry season and hence represent valuable agricultural resources (Turner, 1986; Chapter Three; Chapter Six). Across eastern and southern Africa, large riverine floodplains, lakes, and permanent and seasonal swamps support livelihoods such as fishing, agriculture, pastoralism and craft production (Crafter et al, 1992; Kamukala and Crafter, 1993; Abebe and Geheb, 2003; FAO, 2004). The role of wetlands in supporting major concentrations of people is clear, both historically – as in the lower Nile (Howell and Allan, 1994) and on the Upper Zambezi floodplain (Gluckman, 1941) – and more recently around many irrigation schemes (Chambers, 1969).

Some assessments of the present economic contribution of wetlands confirm the continued importance of these areas. In Zambia the total use value of wetlands (with fish production and floodplain recession agriculture accounting for the main share) was estimated to be the equivalent of approximately 5% of Zambia's GDP in 1990 (Seyam et al, 2001). Looking at the Zambezi river basin as a whole across eight countries, the economic value of wetlands in terms of crops alone was estimated to be close to US\$50 million a year (UNEP, 2006). In addition, the value of wetland fisheries in the basin is estimated to be US\$80 million a year, while its floodplain grasslands support livestock production valued at over US\$70 million annually.

More detailed studies have found that wetlands contribute significantly to the livelihoods of households living near them. In the Kilombero valley in Tanzania, the contribution of wetland cultivation to cash income was 66% of the approximately US\$ 518 cash income per household per year, with poor households getting 80% of this income from wetland cultivation, while the intermediate and better-off households obtained 70% and 48% of their total cash income respectively from wetland cultivation (McCartney and van Koppen, 2004; Chapter 2). Similar findings come from other studies which have shown a wide range in household income generated from wetlands, especially through cropping. In the Ga-

Mampa wetland in South Africa the average annual value of wetland cultivation per household was estimated at US\$93 (Adekola et al, 2008); in Nakivubo urban wetland in Kamapala, Uganda it was US\$300 per household (Emerton, 2005); in the Barotse floodplain in Zambia, \$109 per household (Turpie et al, 1999); in the Lower Shire, Malawi US\$363 per household (Turpie et al., 1999); and in the Chipala Ibenga wetland, Zambia from US\$19 to US\$107 per household (Masiyandima et al, 2004). Household dependence on wetlands and hence demands on wetland resources are, however, highly site specific. While they are partly influenced by the nature of the resources in the wetland, they are also subject to access to markets and changing demands in these markets. Furthermore, socio-economic differentiation leads to significant disparity in the agricultural utilization of the wetlands and the benefits derived from them (see Chapters Two and Three).

In recent years the use of wetlands in Africa, especially for agriculture, has increased to the extent that wetlands have now become a 'new agricultural frontier' in the continent (Dixon and Wood, 2003, p119). The reasons for this are diverse but include: rural population growth and the consequent shortage of farmland; the degradation of upland or rain-fed fields; a reduction in the quantity and reliability of rain-fed harvests; increased needs for earning cash; and the development of new technologies to use these areas, such as treadle pumps (Inocencio et al, 2003). The demand for the livelihood benefits from wetlands is likely to increase further as the impacts of climate change increase, the search for water intensifies in some areas, and as plots where secure harvests can be obtained become increasingly sought-after. Indeed wetlands will become a critical area in the process of adapting to climate change and mitigating its impact – a process which has arguably already started in many areas (Boko et al, 2007; Osbahr et al, 2008).

With these challenges, wetlands are becoming an increasingly valuable multiple use resource in Africa, and are increasingly seen as a safety net for many, especially the poor, to help them cope with the struggle for survival. However, wetlands are also being developed in some places by innovative farmers, often with pumps or other investments, to meet market demands for vegetables and so are becoming a source of capitalist enterprise development (Woodhouse et al, 2000). A critical challenge in both these situations is to ensure that wetlands are used and managed in a manner which does not degrade the

natural resource base from which the various livelihood benefits and ecosystem services are derived and sustained. This is particularly pertinent given that numerous studies have drawn attention to the ways in which wetlands have been degraded as a result of inappropriate management and utilization practices (Roggeri, 1995).

In view of this wide-ranging use of wetlands by rural communities in the continent, and their growing importance, it is clear that people and their management of wetlands are an essential part of the wetlands discourse. The relationship between people and wetlands must be central to the development of wetland policies and wetland management approaches so that they can ensure sustainable livelihoods from these areas.

[b]Sustainability and wetlands

There is widespread evidence in Africa of abandoned and degraded wetlands, the result in most cases of overdrainage and/or erosion which have lowered or disrupted water tables (Roggeri, 1995; Shuyt, 2005). The loss of wetlands through inappropriate management in these areas, and also in adjoining catchments (McFarlane and Whitlow, 1990) draws attention to the fact that the activities of communities in their wetlands need to be sensitive to the environmental processes which are on-going, not least because, in most cases, wetlands are temporary features in the long-term processes of erosion and succession.

It is imperative, therefore, that wetland use strategies integrate the three key principles of sustainability, i.e. they should be:

***Environmentally sustainable*, which means facilitating a wetland use strategy or management plan (which may include agriculture) whose development of provisioning or other sought-after ESS does not irreversibly degrade the wetland and rather maintains the other ESS – typical regulating and supporting – for the foreseeable future;

***Economically sustainable*, which means facilitating wetland use that is economically attractive to users, for which there are clear economic development benefits which continue in the long-term;

****Socially sustainable**, which means that wetland management and utilization strategies are rooted within the local community, developed by local people and based on local knowledge. Wetland management should also be socially and economically equitable so as to avoid conflict which can undermine sustainable use.

While sustainability as a concept has been recognized in the wetland literature, and the wetland management policy agenda has sought to incorporate principles of sustainability into wetland management strategies since the early 1980s, the extent to which this process has been successful in terms of the meeting both the development needs of local people and environmental concerns in an inclusive approach, is debateable. Indeed there have calls for a wider interpretation of sustainability in the discussion on wetlands and it is to the differences in that discourse that we now turn.

[a]The wetlands discourse

The position taken throughout this book, i.e. that wetlands have a critical role to play in developing the livelihoods of people in Africa, especially the poor, is situated within the classic environment and development debates that have dominated the global discourse of natural resource management for many years, and especially with respect to wetlands. Two perspectives / contrasting positions on wetlands can be identified: wetland development and wetland conservation, with evidence of some convergence of thinking occurring over the past 20-30 years (Figure 1.2).

Figure 1.2 *Convergence of thinking towards a people-centred sustainable wetland management approach.*

[b]Wetland development

At one end of the wetland management spectrum has been a *utilitarian* and *development* view, which has encouraged the transformation and use of wetlands by people. Until interest in wetland conservation emerged during the 1930s the dominant view was one of wetlands as unhealthy, unproductive areas that could be more productive if their hydrological regime was manipulated, often by drainage. Certainly this was the case

throughout much of Europe where wetland drainage over several centuries allowed large areas of land to be transformed and cultivated (Cook and Williamson, 1999). In Africa, however, agriculture in wetlands was widespread before the arrival of Europeans as evidenced in folk stories, the visible remains of agricultural practices (e.g. raised bed and furrows) and the literature from early European explorers (Mharapara, 1994; Trapnell and Clothier, 1937; Cecchi, 1886). In West Africa, despite constraints to cultivation (i.e. extensive weed growth, lack of water management technologies and prevalence of water related disease) wetlands were used for rice cultivation (Andriessse et al, 1991). In southern Africa, crops such as *Clues esculentus* (tsenza) cucurbits, cocoyams and a variety of vegetables were traditionally grown by farmers in *dambos* (Mharapara, 1994), while in western Zambia intensive cultivation was practised along the edge of Upper Zambezi floodplain (Gluckman, 1941).

During the colonial period, European farmers in southern Africa were also attracted to wetlands by the “turf like” soils which were easily ploughed and the high moisture retention which allowed cropping in the dry winter months (Whitlow, 1990). The value of wetlands for agriculture was widely acknowledged by agricultural engineers with journal articles of the time discussing the merits but also the environmental risks associated with wetland agriculture:

‘Vleis have considerable agricultural potential mainly by virtue of the fact that they remain wet far into the dry season or even throughout the dry season..... The principal danger in vlei drainage is the development of a gully down the centre of the vlei. Such a gully will be uncontrolled drainage which may and often does completely dry out the vlei resulting in destruction of its naturally good vegetative cover, the destruction by oxidation of the high humus content of the soil and ending with further erosion and ultimate destruction of what was once a valuable asset.’

(Rattray et al, 1953)

It is interesting that in Southern Rhodesia (now Zimbabwe) legislation was introduced to prohibit the use of wetlands (*dambos*) for agriculture long before conservation *per se* was a

major concern. Although the concept of ecosystem services was unknown at the time, the Water Act of 1927 and the Natural Resources Act of 1941 (revised in 1952) prohibited any cultivation along stream banks and in *dambos* in order to protect another perceived service of these wetlands: the provision of water. Despite this legislation cultivation of *dambos* by settler farmers increased substantially through the 1930s and 1940s, (Whitlow, 1990) and it was only in the 1950s and 1960s that conservation pressures resulted in a decrease in the cultivation of *dambos*. Despite there being little evidence to support it, traditional small-scale farming of *dambos* was also condemned. For example, a Commission of Enquiry (1939) denounced peasant cultivation in *dambos*, claiming that ‘...once pleasant valleys [were] transformed by this means to barren stretches of gaping dongas [i.e. gulleys]’ (McFarlane and Whitlow, 1990, p217). However, enforcement of legislation was very variable, in some places farmers were moved off their *dambo* gardens, whilst in others *dambo* cultivation continued (Bell and Roberts, 1991).

During the last 50 years since independence in most African countries, there has been a significant drive for the transformation of wetlands, especially for cultivation. This has come in part from government agencies which see wetland cultivation as a critical way of achieving food security (Wood et al, 2001) or producing export crops, but also from commercial companies seeking to develop profitable enterprises. This has been despite other conflicting government policies which have espoused the conservation of wetlands. In addition, there is widespread evidence from across sub-Saharan Africa of individual farmers using wetlands for vegetable growing in response to market opportunities (Woodhouse et al, 2000) and in other cases as a source of food during the hungry season (Ndiyoi et al, 2009). Examples of this expansion of wetland cultivation on a large scale can be found from around the continent including the development of rice cultivation in the Inland Valleys of West Africa (see Chapter 10), sugar estates in many countries (Temper, 2010), irrigated cultivation of cotton in countries such as Ethiopia (Bondestam, 1974) and the development of the dairy industry in Uganda (see Chapter 7).

Today, although many (mainly ‘northern’ academics) have argued vociferously against the conversion of wetlands on the grounds that it is not sustainable and the temporary benefits are outweighed by the loss of wetland ecosystem services, (see Maltby and Turner, 1983;

Hollis, 1990; Dugan, 1990), the conversion of wetlands to agricultural land remains an attractive option which is used by many farmers throughout Africa. Indeed, for most governments food security concerns are higher up the political agenda than biodiversity conservation and the potential contribution of wetland agriculture to poverty alleviation and development is now widely recognized (Ferreira, 1977; Perara, 1982; Millington et al, 1985; Bell et al, 1987; Daka, 1997; Makombe, et al, 2001; McCartney et al 2005; Kangalawe and Liwenga, 2005; Verhoven and Setter, 2010; McCartney et al, 2010). In Zambia, the National Irrigation Policy (2005) acknowledges the importance of *dambos* and wetlands as sources of water which smallholder and emergent farmers can utilize with low-cost irrigation technology. The potential of wetlands for agriculture is also appreciated by some local authorities. For instance the district council in the vicinity of the Lukanga Swamp (a major wetland in the catchment of the Kafue River) has recently produced a development master plan which explicitly notes that ‘...the swamps are good grounds for sugar cane production, and rice and wheat production’ (Kapiri Mposhi, District Council n.d). Experience of government supported wetland development is also seen in many irrigation and swamp drainage schemes in East and West Africa (see Chapters Two, Four, Seven, Nine and Ten).

Undoubtedly one of the successes of the global wetland conservation movement has been to raise awareness of the potential risks of wholesale wetland conversion, instilling a precautionary ethic amongst wetland users and planners. However, in this book we argue that wetland conversion, particularly for agriculture, should be one option to be considered on a case by case basis given its important contribution to the livelihoods of the rural poor, and the way in which it can stimulate rural development (although we also stress that this must be done within an understanding of the impacts on specific ecosystem services). Roggeri (1995), for example, suggests that the conversion of wetlands may be justified in circumstances where:

- **social and economic needs are particularly pressing;
- **wetland conversion is the only solution which would meet these needs;
- **it has been demonstrated that the wetland could contribute significantly to meet these needs;

**it has been demonstrated that the wetland in its natural state is of minor value (and that its value will not increase in the future).

Roggeri (1995, p86)

More recently it has been argued by the MA (2005) that wetland agriculture should be conceptualized as a wetland provisioning service and that careful management that encompasses appropriate water and agricultural practices can result in a net increase in the total ecosystem services / benefits derived from a wetland (McCartney et al, 2005). Such an approach recognizes trade-offs associated with changes in the ecological condition of a wetland (e.g. reduced cultural and regulating services in exchange for increased provisioning services such as food and water) (MA, 2005) and, while accepting the difficulty of identifying and quantifying the full suite of services provided by any given wetland, proposes management approaches that explicitly consider these trade-offs (McCartney et al, 2005).

Overall in the wetland development discourse there has been a gradual transition from an economic development 'at all costs' approach to agriculture in wetlands – focused primarily on raising output, to a realisation that agricultural systems are underpinned and depend fundamentally on ecological processes and the services provided by the wetlands. There is now an understanding that environmental and social factors have to be considered in much greater detail in wetland development than was typically the case in the past, in order to ensure environmental sustainability, socially acceptable development and economic sustainability. Nonetheless the focus here remains on people using wetlands and the contribution of wetlands to development in a sustainable way.

[b]Wetland conservation

The second perspective that has contributed to the wetlands discourse can be described as a conservation / preservation approach. From a conservation biology perspective the goal of wetland conservation is the protection of species and biodiversity, although the underlying rationale for this may be rooted in various ideologies ranging from a recognition of the intrinsic value of biological diversity (a so-called 'deep ecology' approach) to more anthropocentric approaches which value biodiversity from a utilitarian perspective (e.g. the provision of medicines or wildlife tourism) (Pepper, 1996). In theory there are some marked

differences between 'conservation' approaches, which tend to be associated with active management and sustainable resource use, and 'preservation' which implies protection from any forms of use. In practice, and in the context of wetland management in Africa, however, the differences between conservation and preservation have often become blurred in recent years (Adams, 2009).

The origins of the modern day wetland conservation movement can be traced back to concerns for waterfowl populations, originating first during the 1930s in North America, and then later during the 1940s in the Europe. Recognition of the need to protect wetland habitats for endangered species was central to the establishment of the Wildfowl and Wetlands Trust in 1946, and was also incorporated into the mandate of the IUCN (World Conservation Union, originally known as the International Union for the Protection of Nature) established in 1948. In 1960, the IUCN received a proposal calling for an international programme specifically dedicated to wetlands, and throughout the decade discussions among various governments and NGOs, particularly IUCN, IWRB (International Waterfowl and Wetlands Research Bureau, which later became Wetlands International) and ICBP (International Council for Bird Preservation, now Birdlife International) discussed the wide range of issues affecting wetlands and the feasibility of implementing such a programme (Matthews, 1993). In 1971 this process culminated in the creation of the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, which set out a process of accession for countries wishing to designate and list wetlands of international importance for conservation purposes (Matthews, 1993; Davis, 1994).

Although space precludes a detailed discussion of the development of the Ramsar Convention (see Matthews, 1993; Farrier and Tucker, 2000; Bowman, 2002), it is important to consider the influence the convention has had on wetland policy-making over the last 40 years, not least because it remains the only international wetland convention and has, until recently, been dominated by the conservation interests of the global north. The conservation focus is evident in its original text which makes it clear that wetlands and their various ecological functions should be protected from human encroachment for the benefit of waterfowl, and that protection should be achieved via the '... conservation of the

wetlands included in the list' (Ramsar, 1971: Article 3). Although the text goes on to suggest that countries should also promote '...as far as possible the wise use of wetlands in their territory', thus suggesting that some form of human intervention is acceptable, it would be a further 16 years before the concept of 'wise use' was formally defined and recommended for adoption by contracting parties:

'The wise use of wetlands is their sustainable utilization for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem'.

'Sustainable utilization is defined as human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations'.

'Natural properties of the ecosystem are defined as those physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them'.

(Ramsar, 1987: Recommendation 3.3)

While in many respects this was a significant step forward in acknowledging the importance of people in wetland utilization (occurring during a period of unprecedented global interest in sustainable development), the wise use principle remained problematic for several reasons. First, in terms of attempting to embrace sustainable development and bring together conservation and the needs of people, it remained heavily skewed in favour of environmental concerns, not least because of the incompatibility between human use and the maintenance of 'natural properties'. As Farrier and Tucker (2000) point out, 'naturalness' is a state which is difficult to define with regards to wetlands, especially since very few wetlands will have evaded the influence of humans in one way or another. A second related issue is the nebulous nature of natural properties themselves (what Ramsar reinterpreted as 'ecological character' in 1999, and later linked to the MA's 'ecosystem services' in 2005), and the evidence for their occurrence in wetlands.

Finally, another problem with the adoption of the wise use principle is that it has served to legitimise some forms of human interaction with wetlands but not others, and hence raised issues of equity particularly regarding access to these resources – an issue with particular ramifications for poor people in Africa. Consequently, the forms of acceptable ‘wise use’ which were being promoted widely in the literature and wetland conservation initiatives during the late 1980s and early 1990s, tended to consist of non-transformational uses of wetlands such as fishing and reed collection, and argued against any intrusion of agriculture into wetlands (Marchand and Udo, 1989; Dugan, 1990). These approaches, often operationalised and branded as Integrated Conservation and Development Plans (ICDPs), actively sought the participation of local people in wetland management strategies, and whilst they were successful in conserving the natural status of many wetlands, their contribution towards livelihoods is unclear. In a review of ICDPs Sellamuttu et al (2008) suggest a range of problems including poor economic returns from alternative incomes for local people, a poor understanding of the dynamic complexities of people’s livelihoods and the local context on the part of conservationists, unrealistic development targets and the lack of monitoring. Overall, there is little evidence to suggest that these initiatives had a major impact on poverty reduction, or addressed other critical needs such as food security (Kellert et al, 2000; Fisher et al, 2005).

One other important, but debatable, achievement of the global wetland conservation discourse has been the promotion of universal wetland values, functions and attributes, the mention of which has become a prerequisite to any government report or academic paper discussing wetlands. The empirical scientific evidence, however, remains sketchy and often contradictory, with some wetlands having the functions widely attributed to them and others not (Bullock and Acreman, 2003; McCartney et al, 2010; McCartney et al, 2011). This has tended to fuel the debate between the conservationists and those concerned with the development of wetlands because of the often unrealistic claims about the ESS present in specific wetlands.

[b]Putting livelihoods into wetland conservation

Since the late 1990s there has been a marked reorientation towards human development in wetland conservation which has been reflected in the themes of the Ramsar COP meetings (see Table 1.2) (although prior to COP7, meetings were not assigned a specific theme).

Table 1.2 *Recent Ramsar Convention COPs*

Year	Location	Theme
1999	San Jose, Costa Rica	COP7: 'People and Wetlands: the vital link'
2002	Valencia, Spain	COP8: 'Wetlands: water, life, and culture'
2005	Kampala, Uganda	COP9: 'Wetlands and water: supporting life, sustaining livelihoods'
2008	Changwon, Korea	COP10: 'Healthy Wetlands, Healthy People'
2012	Bucharest, Romania	COP11: 'Wetlands: Home and Destination'

Of particular note is the inclusion of 'sustaining livelihoods' in the title of COP9, the first to be held in Africa, and significant for several reasons. First, it integrated the MA's ecosystem services concept into a new definition of wise use:

'Wise use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development.'

(Ramsar, 2005: p6)

Secondly, the meeting was also notable for its attention to river basin planning, a hitherto neglected area of the convention, which critics suggested had resulted in wetlands erroneously being viewed in isolation from upstream and downstream influences. Thirdly, and perhaps most significantly, the Convention recognised the importance of the Millennium Development Goals as internationally agreed development strategies, and set out actions for contributing to poverty reduction (Resolution IX.14) (Box 1.1). Despite the significant mention of developing 'capacity to use' and 'respecting the rights of local communities', however, the following COP in 2008 acknowledged the lack of clear guidance in this resolution. This was addressed to some degree at that COP by Resolution X.28, which somewhat significantly shifts the emphasis from poverty 'reduction' to poverty

‘eradication’, and subsequently goes on to emphasise the importance of wetlands for human health, the inclusion of traditional knowledge into wetland management strategies, and the potential role that financial incentives could play in wetland management (Box 1.1).

[!box!]

Box 1.1 *Wetlands and Poverty Reduction: Resolutions IX.14 and X.28*

a) Detail from Resolution IX.14 (2005) ‘Wetlands and Poverty Reduction’

The conference of the contracting parties ...

7. Urges all Contracting Parties and other governments to take action to contribute to poverty reduction, especially in the following areas:

- *human life and safety*: measures to protect against impacts such as cyclones, etc. ... through the sustainable use and restoration of wetlands;
- *access to resources*: measures to improve access to and develop capacity to use, on a sustainable basis, land, water and wetland resources ... respecting the rights of local communities and indigenous peoples;
- *ecological sustainability*: measures to enhance the priority given to sustainability in all relevant mainstream policy sectors, including ecosystem restoration measures;
- *governance*: measures to improve the empowerment of the poor;
- *economies*: measures to maintain or improve, on an ecologically sustainable basis, the ecosystem benefits/services that wetlands provide;

Source: http://www.ramsar.org/pdf/res/key_res_ix_14_e.pdf

b) Detail from Resolution X.28 (2008) ‘Wetlands and Poverty Eradication’

The conference of the contracting parties ...

Urges Contracting Parties, in relation to the framework of actions set out in Resolution IX.14, also to:

- continue to seek to integrate wetland wise use and management, including wetland restoration as appropriate, into all relevant national and regional policies, e ... the role of wetlands in sanitation and human health;
- respect and incorporate traditional knowledge and practices and local perspectives into national wetland management and sustainable livelihood initiatives;
- ensure that any early warning systems and contingency plans established to safeguard people against natural disasters ... include the use of wetland management and, as appropriate, restoration measures;
- collaborate with relevant institutions in developing suitable ecotourism activities in wetlands;

- collate knowledge on best practices and promote its transfer for the wise use, extraction, processing and marketing of wetland products in order to enhance poverty eradication;
- establish financial incentives or investments such as micro-credit schemes ... that improve wetland management and contribute to tangible poverty eradication;
- encourage the introduction of payments for ecosystem services as a means to raise funds for poverty eradication programmes;
- consider wetland services as economic goods so that their use may be included in tax-based economic mechanisms such as user pays;
- e the importance of identifying existing marketing networks and ways to access these; and
- take measures to safeguard peoples' livelihoods derived from wetlands in areas where mining and other extractive industries are taking place,

Source: http://www.ramsar.org/pdf/res/key_res_x_28_e.pdf
 [!box ends!]

This shift in Ramsar thinking has been mirrored in other wetland conservation ations such as the Netherlands-based Wetlands International (WI), which in 2005 established its 'Wetlands and Poverty Reduction Project' (WPRP). Working in three target areas within Africa, the project sought to demonstrate how sustainable wetland management, based on 'wise use', could be integrated into poverty reduction strategies (Wetlands International, 2005). Like the Ramsar Convention, the WPRP highlighted its strategic alignment with the Millennium Development Goals, which have become increasingly influential in conservation organizations. Indeed, the Millennium Declaration and the universal acceptance of the 8 goals and 21 development targets have significantly altered the landscape of international aid, to the extent that it has raised some difficult questions for the conservation movement over whether it is morally justifiable to conserve wetlands in ways which deny people an opportunity to develop their livelihoods in all potential ways (Fisher et al, 2005).

In response, and as suggested above, many wetland conservation ations have taken steps to reposition their activities to embrace development goals and livelihood outcomes, but concerns have been raised over the extent to which the issues of livelihoods and poverty reduction are being 'tagged on' to conservation programmes as a convenient way of accessing funding. Critically, what even the most enlightened wetland conservation initiatives appear to lack is a 'bottom-up' approach to exploring wetland-based livelihoods, i.e. one which examines the development needs and aspirations of local people, and then

seeks to identify how these can be achieved alongside the sustainable use of ecosystem services. One key reason why such an approach is seldom pursued can be summarised in one word: agriculture. Indeed, the transformation of wetlands by agriculture remains a serious concern among most conservationists and one which is well justified as agriculture has long been cited as the greatest threat to wetlands and their conservation or sustainable use (MA, 2005), principally because:

****agricultural interventions often have significant impacts on the ecology and hence functioning of wetland ecosystems;**

****agriculture, both within wetlands and in their catchments, can cause significant degradation of wetlands (particularly through disruption of hydrology) leading to the loss of many beneficial ecosystem services and ultimately even undermining the agriculture itself;**

****agriculture is the leading pressure upon wetlands and, despite often leading to degradation, short-term gains from cultivation to address economic and survival needs are being given precedence over long-term sustainability; and**

****increasing development of large-scale agriculture and irrigation (in conjunction with associated infrastructure e.g. dams) will, without doubt, result in increased pressure on Africa's wetlands in the near future.**

The wetland conservation movement, and particularly the Ramsar Convention, has undoubtedly played a significant role in conserving wetlands and some of their associated ecosystem services around the world over the last 40 years. These actions have also, made significant progress in developing and adapting their strategic focus in response to changes in the wider policy making and development arena. However, in order to seriously address the MDGs, especially poverty reduction and sustainable livelihoods in Africa, it is essential that they face the monumental challenge of agriculture in wetlands and explore how to mainstream agriculture-based livelihoods into sustainable wetland management strategies.

[b]Convergence

Clearly wetland conservation and development perspectives have both given rise to specific challenges for wetland policy and practice. Despite emerging evidence of a recent

convergence in thinking, in terms of a focus on human well-being among conservationists and recognition of the multiple dimensions of sustainability among proponents of wetland development, we argue that the challenge remains of developing an approach which integrates environmental and socio-economic development perspectives to ensure sustainable wetland use. It is to the development literature that we now turn to explore other potential contributions to the wetland discourse which may help achieve this goal.

[a]Learning from 'Development': linking wetlands to livelihoods

The wetland conservation movement's attempts to integrate livelihoods and development outcomes into wetland management initiatives, represent one way of conceptualising the livelihoods-wetlands nexus. An examination of the discourse of Development over the last 30 years, however, reveals some alternatives which place people and livelihoods as the starting point and at the forefront of strategies that seek to balance environment and development outcomes. These approaches, which we review briefly below, have been little considered in the wetland discourse, and it is our view that these could help progress the convergence of thinking towards people-centred sustainable wetland management.

[b]Community-based approaches

Throughout the 1970s many academics and practitioners began to recognise that large-scale development schemes addressing poverty were achieving only mixed results at best, due to a top-down planning process which failed to appreciate or understand the environmental, social and economic complexities of Africa (Chambers, 1990). Consequently, a range of new ideas that included the basic needs approach, participatory bottom-up development, and sensitivity to indigenous knowledge, began to be influential in development circles during the late 1970s and early 1980s. Of particular significance was the work of Robert Chambers who asserted that rural poverty often went unperceived because of biased research and fundamental misunderstandings about people and their livelihoods (Chambers 1983; 1990). Chambers' efforts to promote a 'farmer first' paradigm in development (Chambers et al, 1989) were particularly influential among northern Aid agencies and NGOs, and resulted in a shift in focus towards people and local communities themselves in the development process and their interaction with resources and the environment.

A central driver of this community-level approach to development was the interest generated by an emerging (some would say belated) recognition that many local communities drew on a body of indigenous knowledge of their environment to organise natural resource management activities, to support their livelihoods (Howes and Chambers, 1979; Brokensha et al, 1980). Further research throughout the 1980s and 1990s went on to highlight the dynamic and adaptive nature of indigenous knowledge, and critically, how this underpins adaptive and sustainable community based natural resource management (CBNRM) (Chambers et al, 1989; Tiffen et al, 1994; Warren et al, 1995; Leach and Mearns, 1996; Reij and Waters-Bayer, 2001; Folke et al, 2002). In contrast to neo-Malthusian perspectives which regarded people as degraders of their environment, evidence from the field appeared to suggest that local people could be powerful agents of sustainability and could even rehabilitate their environment (Tiffen et al, 1994). Moreover, this view was also supported by emerging evidence of the important role played by indigenous community organizations in developing local institutional arrangements for managing common pool resources; because they are rooted in indigenous knowledge and community understandings of dynamic local environments and livelihoods, these organizations and institutions are arguably best placed to establish the rules of engagement with natural resources, and in many cases they have been successful in balancing sustainable resource use with livelihood needs (Ostrom, 1990; Blunt and Warren, 1996; Hinchcliffe et al, 1999; Pretty and Ward, 2001; Mazzucato and Niemeijer, 2002). The Institutional Analysis and Development (IAD) Framework developed by Ostrom et al (1994) has also made a key contribution to recent CBNRM approaches by providing a conceptual model for understanding how the interplay of livelihoods, resources and institutional arrangements create patterns of interaction with resources, which themselves lead to specific resource management outcomes (see Koontz, 2003; Sellamuttu et al, 2008).

CBNRM approaches, therefore, have the advantage of placing people, knowledge, institutions and livelihoods as the starting point for environment-development relationships, and in practice they have sought to build capacity from the bottom-up and engender social, economic and environmental sustainability. Nonetheless, they have come under criticism not least because of their perceived variable success in balancing sustainable

resource use with poverty reduction (Blaikie, 2006; Fisher et al, 2005). A fundamental issue here, however, relates to the inconsistencies among the goals of these approaches; CBNRM has often been used as an umbrella term for a range of very different project interventions which may be skewed towards either towards conservation or development outcomes. Yet despite these concerns there are clearly lessons to be learned from CBNRM and the ideas which have shaped them, for the development of wetland based livelihoods.

[b]Socio-ecological systems, resilience and sustainable development

Socio-ecological systems theory has its roots in a systems view of the environment, which emphasises the dynamic and adaptive interrelationships between biological systems and the physical environment. As such, ecological systems are considered to be both self-organizing and self-maintaining (Berkes and Folke, 1992). When applied to human-environment relationships (or 'human ecology') the natural environment similarly places constraints on human systems, which in turn adapt, organize and modify their relationship with the environment and natural capital in a series of feedbacks. Proponents of a socio-ecological systems approach suggest that these human-environment relationships are site-specific, constantly evolving, and fundamentally complex in nature. Critically, however, they tend to behave in 'non-linear', unpredictable ways which makes management particularly challenging (Folke et al, 2002). In urging the need for a wider appreciation of the complexity of socio-ecological systems, Ostrom (2007) is especially critical of the dominant global discourse of natural resource management which has tended to pursue simplistic, linear, 'panacea' solutions to resource management problems, rather than seeking 'appropriate types of solutions for specific niches' (Ostrom, 2007: 4). Put plainly, the first key message emerging from the socio-ecological systems literature is that each environment-development scenario is unique, and requires an understanding of the social, economic, ecological and political circumstances that render it as such.

However, as well as arguing the need for more nuanced, diagnostic approaches to environment-development issues (Ostrom, 2007; 2009), advocates of socio-ecological systems approaches have made significant contributions to the discourse of sustainable development in recent years through mainstreaming two important concepts: resilience and adaptive capacity. If sustainable development means sustaining and enhancing the

social, economic and ecological benefits derived from socio-ecological systems, then not only do researchers and practitioners need to understand the social, economic and ecological inter-relationships that exist, they also need to understand how these complex systems evolve, respond and adapt, particularly given the unpredictability of external events. The capacity of a socio-ecological system to buffer and absorb shocks and pressures, whilst continuing to function, constitutes its resilience (Adger 2000; Folke et al, 2002; Berkes et al, 2003). Conversely, where systems have little resilience and hence are considered vulnerable, external pressures can lead to serious and irreversible change, for example in terms of ecosystem degradation, or the erosion of social capital. While it is easy to see why, in academic and practitioner circles, 'resilience' and 'vulnerability' have become synonymous with 'sustainable' and 'unsustainable' respectively, the links are not as clear cut; what could be considered a system's resilience to pressure could just as well denote a resistance to change, which is arguably incompatible with the principles of sustainable development. Resilience, rather, infers a more positive dynamic response to change and is central to supporting and enhancing adaptive capacity, i.e. 'the ability of a socio-ecological system to cope with novel situations without losing options for the future' (Folke et al. 2002:7). In ecological systems, adaptive capacity is represented in terms of biodiversity, where species have colonised and adapted to changes in the physical environment (biodiversity in turn is credited as further enhancing resilience). In social systems adaptive capacity is manifest in institutional arrangements for common property resources, social networks, and human capital in terms of knowledge acquisition and innovation (Ostrom, 1990; Berkes, 1999; Adger, 2000; Berkes et al, 2003; Olsson et al. 2004).

The second key contribution of socio-ecological systems to the broader environment-development debate, therefore, is the idea that management interventions should focus on building resilience (both social and ecological) and adaptive capacity as a means of facilitating sustainable development. Folke et al (2002) suggest several priority areas here for policy-makers that include developing indicators of resilience and vulnerability for resource systems, identifying thresholds of change and pressures, and developing adaptive management strategies in which both resource users and policy-makers at different levels 'learn by doing'. However, these require a policy-making and governance environment that

is equally adaptive, flexible, and capable of simultaneously supporting a range of management options for resource systems.

[b]The Sustainable Livelihoods Approach

The Sustainable Livelihoods Approach (SLA), developed during the 1990s at the Institute of Development Studies (IDS) and the UK Department for International Development (DFID), is a tool for analysing the livelihoods of the rural poor. Drawing particularly on the work of Robert Chambers and Gordon Conway, Scoones (1998: p7) conceptualises a livelihoods as:

‘...the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base.’

The Sustainable Livelihoods Framework (SLF) which encapsulates the approach (Figure 1.3) attempts to illustrate how the livelihood strategies pursued by the rural poor are directly related to their local-level assets, but that the use of these assets are influenced by the wider socio-economic, political, cultural and environmental context that include government policies, market forces, institutions, and a ‘vulnerability context’ that includes elements of uncertainty such as environmental or socio-economic change. A sustainable livelihood is one which results in material and financial benefits through increased well-being, improved resilience and enhanced food security but which critically maintains the environmental sustainability of the resource base.

Figure 1.3 *The Sustainable Livelihoods Framework* (adapted from DFID, 1999)

NOTE – THIS TABLE GOES DIRECTLY BELOW FIGURE 1.3

Livelihood Assets

Human Capital	Skills, knowledge and abilities, health status, availability of labour
Natural Capital	Natural resources such as land, forests, fisheries, wetlands, biodiversity
Physical Capital	Infrastructure and producer goods; water, energy, transport, shelter, communications.
Financial Capital	Stocks and flows of money, e.g. savings, remittances
Social Capital	Networks and connections with others, membership of civil society groups,

This framework is, therefore, a useful way of conceptualising wetland-livelihood relationships principally because it breaks down wetland based livelihoods into their constituent parts and helps pinpoint the specific factors or processes which are influential in determining the various livelihood outcomes (Ellis, 2000). For example, a sustainable wetland-based livelihood clearly depends upon the availability of natural capital, i.e. wetland ecosystem services, but also potentially social capital, i.e. the relations of trust and reciprocity within a community which may ensure equitable access to wetland resources (see Chapter Four). Similarly, human capital, in terms of the labour, knowledge and skills required for wetland use is critical. Where these various assets exist and are strong, the resilience of the livelihood strategy to external shocks and pressures is also increased, and hence the chances of achieving positive livelihood outcomes (including the maintenance of ecosystem services) are maximised.

Despite its enthusiastic reception during the late 1990s, interest in the SLA appears to have waned during the late 2000s with critics questioning its utility beyond the household level, its oversimplification of policy and institutional processes, and the lack of attention paid to intra-household dynamics and gender power relations. Nonetheless, the SLA remains a vital component of sectoral programmes within many of large development agencies, and as recently as 2008 was being adopted as a framework for analysis in Wetland International's WPRP (Sellamuttu et al, 2008).

[b]Reflections

What these approaches have in common is an explicit engagement with the environmental, social and economic dimensions of sustainability, and in addition, a commitment to an equitable and sustainable form of development where the goal is the enhancement of both human and ecological systems. In different ways, they have sought to redress the balance between human well-being and their dependence on natural resources on the one hand, and environmental sustainability on the other, by drawing attention to the complex symbiotic relationships between the two. The emerging lessons here for wetland management in Africa are clear. First, whilst all these approaches emphasise the importance

of multi-level stakeholder engagement, the participation of local wetland users in the planning, management and decision-making process is essential; no one understands wetlands-based livelihoods better than those who are actually engaged in them, and local users are likely to have developed environmental knowledge and institutional arrangements over time. Secondly, wetland livelihood systems are dynamic in space and time, and unpredictable. They are influenced by site-specific ecological feedbacks and local social and institutional contexts, which the traditional top-down 'one policy fits all' approach would find difficult to accommodate. Again, multi-stakeholder participation in the form of adaptive co-management offers one way forward in decentralising wetland policy making. Finally, given the complexity and uncertainty of wetland systems, building resilience at the local level is arguably a fundamental pre-requisite to achieving environmentally, socially and economically sustainable wetland livelihoods. Understanding local level wetland-people relationships and existing institutional arrangements that facilitate socio-ecological resilience should be an entry point for policy makers.

[a]Recent contributions to wetland thinking

Three studies since 2005 have attempted to move the wetland management discourse forward, albeit with limited direct reference to the development discussion above. These studies, outlined below, have sought in different ways to merge ecological interests with development agendas, and specifically acknowledge the importance of agriculture in wetland livelihoods. Each has sought to integrate these ecological and development aspects into practical management strategies.

[b]The Millennium Ecosystem Assessment (MA)

The Millennium Ecosystem Assessment in one of its many reports examined wetland functions, services and benefits, and applied to these the new ESS framework (MA, 2005). From a human development perspective it is significant how this framework, emerging from a primarily ecological study, recognises the diverse ways in which ESS contribute to livelihoods and development, especially through wetland provisioning services (Table 1.1). It also identifies how the maintenance of provisioning services is linked to the other three ecosystem services, and how, for instance, undermining supporting and regulating services can reduce the ability of the wetlands to provide provisioning services. Hence, the MA

explicitly acknowledges that the ecosystem services of wetlands together will play a key role in achieving the MDGs, and so stresses the need for a holistic view. It recognizes that the development of livelihood benefits from the provisioning services of wetlands can make an important contribution to poverty reduction and that those benefits may be used to justify limited conversion in selected cases. At the same time, it argues that the over-development or over-use of some ecosystem services, notably provisioning services, will lead to the undermining of other ecosystem services (e.g. regulating) and so will make achievement of other MDGs (e.g. safe drinking water and sanitation) problematic. As a result, the MA suggests that balancing ESS in wetlands is essential for their survival.

Whilst this approach has much in common with Ramsar's 'wise use' and 'sustainable utilization' concepts (and indeed the MA itself acknowledges that it provides a 'framework for the delivery' of Ramsar's goals) the approach is arguably more progressive and takes the debate forward in several ways. First, as mentioned above, it emphasises the importance of human well-being and the ways in which different ecosystem services can support this. Secondly, it raises the important issue of trade-offs among ecosystem services, and suggests that consideration of trade-offs should be central to the design of interventions that support the MDGs. Thirdly, it advocates the wider use of economic mechanisms, such as the direct economic valuation of wetland services and payment for ecosystem services, arguing that wetlands have tended to be ignored or under-valued by resource users and markets in the past. In spite of these innovations, however, the MA ultimately takes a conservationist approach to the issue of transformational uses of wetlands, especially agriculture, which it regards as a major driver of wetland loss. Rather disappointingly, it also advocates a technocentric approach to management:

'In regions where agricultural expansion continues to be a large threat to wetlands, the development, assessment and diffusion of technologies that could increase the production of food per unit area sustainably, without harmful trade-offs related to excessive consumption of water or use of nutrients or pesticides, would significantly lessen pressure on wetlands.'

(MA, 2005, p66)

Although it does go on to concede that some countries ‘... lack the financial resources and institutional capabilities to gain and use these technologies’, with the exception of occasional reference to ‘stakeholder involvement’, there is little discussion of the perspective of local people and the role which they and indigenous technologies and institutions can play in sustainable use and management of wetlands.

[b]The Comprehensive Assessment of Water Management in Agriculture (CA)

The Comprehensive Assessment of Water Management in Agriculture (CA) comprised a critical evaluation of the benefits, costs and impacts of the past 50 years of water development, the water management challenges communities face today, and the solutions so far developed (CA, 2007). It addressed the overarching question: *how can water management in agriculture be developed and managed to help end poverty and hunger, ensure environmentally sustainable practices, and find the right balance between food and environmental security?* It was undertaken by the International Water Management Institute (IWMI), in conjunction with a broad alliance of researchers and policy-makers, including amongst others, the secretariat of the Ramsar Convention, the Consultative Group on International Agricultural Research (CGIAR), the UN Food and Agricultural Organisation (FAO) and the Convention on Biological Diversity (CBD).

The CA considered both the importance of wetlands for agriculture and the adverse impact of agriculture on wetlands, thereby providing a direct link to the MA. In common with the MA, the CA highlighted the fact that the expansion and intensification of agriculture has had many benefits for society, but has also had adverse impacts on ecosystems globally. It also highlighted the fact that agricultural systems depend fundamentally on ecological processes, so if ecosystems become degraded not only are many direct ecosystem services lost but agricultural productivity itself may be undermined (CA, 2007).

In contrast to the MA, the primary focus of the CA was not on maintaining the wetland ecosystems *per se*, but rather on sustainably optimizing the livelihood benefits from those ecosystems. Hence, a key distinction between the CA and the MA is the recognition that managing ecosystems for livelihoods is going to have an impact and this is not necessarily congruent with managing them for biodiversity goals. The CA develops further the idea of

conflicts of interest in wetland use and the need for trade-offs between livelihood requirements and conservation that need skilful and innovative forms of management to balance. The objectives of addressing these trade-offs should not be to maximize values for conservation and poverty reduction simultaneously but rather to produce the greatest overall net benefits for people whilst at the same time avoiding fundamental ecological threats and ensuring long-term sustainability of all ecosystem services (Sellamutu et al, 2008). Thus a pluralistic approach is required that provides opportunities to increase the overall productivity of agricultural systems whilst ensuring that all uses of ecosystem services are enhanced rather than harmed by agricultural development (Nguyen-Khoa et al., 2008).

The CA emphasized that drivers of wetland conversion for agriculture will intensify over the next three decades as populations rise and the demand for increased economic output and food production rises steeply. It also noted that these drivers of change will be most likely exacerbated by climate change and will be most severe in developing countries. In recognition of this the CA stressed the need to identify:

- **how the ecosystem services that contribute to agriculture can be enhanced, and
- **how agricultural activities can be designed to contribute to ecosystem functioning (CA, 2007).

It argued that in future, much greater emphasis must be placed on managing agricultural systems (whether in wetlands or not) as an integrated part of the landscape for multiple rather than single services (i.e. for the full suite of ecosystem services). However, it also recognized that difficult choices will have to be made; win-win situations are rare and better approaches for managing trade-offs are required (CA, 2007).

[b]Guidelines for Agriculture-Wetland Interactions (GAWI)

The third recent study is an initiative that linked both conservation and development perspectives. This involved FAO and the Ramsar Convention Secretariat, along with IWMI, Wetland Action and Wetlands International, exploring how to achieve sustainable use regimes for agriculture in wetlands (Wood and van Halsema, 2008). Between 2005 and 2011

GAWI undertook a number of activities including a meta-analysis of 92 cases of wetland management from around the world.

The GAWI meta-analysis applied the Drivers-Pressures-State Changes-Impacts-Responses (DPSIR) analytical framework (see Smeets and Weterings, 1999) as a tool for analysing the agricultural-wetland interactions in 92 case studies and identified pressure points for change. The study confirmed the growing imbalance in ESS in wetlands as a result of agricultural development. In order to sustain the benefits from wetlands and achieve the re-balancing of ecosystem services as suggested by the MA for sustainable use, it was recommended that all ESS, provisioning and non-provisioning ones, should be put to fruitful use in a wetland or across a wetland network in a stream / river basin taking a landscape approach. This rebalancing of ESS may involve a number of interventions which could include:

****redirecting the drivers of change so that the specific needs of society (which lead to drivers) can be met in other ways – through trade, employment, non-wetland farming development, any of which could reduce the imbalances in ESS and the negative state changes in wetlands or elsewhere in the river basin system;**

****diversifying the wetland provisioning services used beyond agriculture - through the addition of fishing, crafts, ecotourism and payment for environmental services etc, so as to still meet household needs while reducing the pressures from mono-agriculture upon the wetlands and the negative state changes and impacts due to cultivation;**

****diversifying the demands on wetlands for different ecosystem services so that non-provisioning services can generate income, especially through payment for environmental services for regulatory or biodiversity conservation services;**

****managing land at the basin level in ways to facilitate the maintenance of a balance of ecosystem services overall, with different ESS provided at different points in the river / stream system;**

****improving crop choices to plants that require less alteration of the wetland ESS, e.g. irrigated rice, or taro (*Colocasia esculenta*) as opposed to drainage for cultivation of maize.**

From this work it has become clear that across the globe, but particularly in sub-Saharan Africa, there is the need for a change in thinking about wetlands. This should involve a move from a situation of competition amongst stakeholders who each seek to achieve mono-ESS use of wetlands to meet their own specific interests – agriculture or biodiversity conservation, to a situation where stakeholders work together to achieve a mix of ESS in wetlands, with mutually advantageous multiple benefits which help ensure the sustainability of all ESS and wetlands in the long term. This will require the setting of priorities and policies for the different ESS to be developed or maintained in different parts of a wetland or along a stream valley system, in order to accommodate the multiple demands made on wetland ecosystems. The DPSIR analysis helps achieve this by mapping out the socio-economic demands for specific ESS and the state changes and impacts which result from the development of these ESS, along with their consequences for the balance of services in a wetland system. Overall a congruent and harmonious functional management strategy must be developed that links each demand from society to a specific ecosystem service but also maintains the balance of ESS overall and ensures long-term sustainability.

[b]Key points from the evolving discourse.

To summarise, these three documents show the development of a number of key themes which are important for the development of sustainable wetland management for livelihoods in Africa. These are:

****recognition of contribution of wetlands to livelihoods and MDGs through provisioning services, especially agriculture;**

****identification of the growing threats which agriculture and livelihood development can present to the maintenance of wetlands and their full range of ESS;**

****recognition of the linkages amongst ESS and the need to keep a balance or a mix of ESS in order to maintain the functioning of wetlands, i.e. for their ecological sustainability;**

****developing values for communities from the different ESS, especially generating values for neglected ESS such as regulatory and biodiversity services, sometimes through payment for environmental services (PES);**

****maximising total benefits for society from the full range of wetland ESS and not just to maximise the benefits from one alone;**

**recognizing the need to explore different trade-offs between ESS in wetlands, in conjunction with the wider landscape, so as to maximise overall benefits and maintain a mix of ESS;

**using trade-off methods to address the competing demands and conflicts which can develop between different interest groups with respect to wetland ESS and so ensure sustainability; and

**recognizing the role of people in the management of wetlands for ESS maintenance as wetland users managing agriculture and other provisioning services so as to maximise and sustain overall benefits.

[a]A way ahead

Building on these key points, especially the MA, there have been several recent contributions to the wetlands discourse, that have emphasized the role of wetlands for human benefits, especially for health (Horwitz et al, 2012), for livelihoods and poverty reduction (Kumar et al, 2011) and also for ESS and conservation (Maltby and Acreman 2011; Finlayson et al, 2011). While all acknowledge the need for increasing recognition of the role of people in wetland management, most remain firmly focused on ecological outcomes. At the same time other recent literature reasserts the central role of people not just as beneficiaries but also as actors in wetland use. These include work from IWMI (McCartney et al, 2010) which stress the contribution of wetlands to livelihoods, especially agriculture and the challenge of reaching sustainable multiple use in wetlands. Similar works include those by Dixon and Wood (2007) on the role that community-based institutions play in managing wetlands, and by CPWF (2010) on balancing social welfare and environmental security in wetland-based livelihoods. But while there is clear recognition of people as active users and managers of wetlands, these papers are limited in their identification of specific actions which are needed to achieve sustainable use and development of wetlands for livelihoods and poverty reduction.

In the view of the editors and authors of this book, there is no doubt that people need to be put at the centre of exploring how to progress towards sustainable wetland use and development in Africa, with the balance of ESS maintained to ensure sustainability. In this book a new framework for thinking about wetlands is proposed which sees people as

inextricably connected to wetlands. Their inclusion is essential to ensure sustainability with respect to all ESS. We believe that this represents a paradigm shift and is a logical culmination in the evolution of thinking over the past decade. We strongly believe that such a change in thinking is essential if African wetlands are to be managed in a manner that, in the face of upcoming pressures, including climate change and food provision, will safeguard their existence and the essential ESS that they can contribute to livelihoods and development.

This paradigm argues that people must be recognized as active user managers, not as conservation managers and certainly not as top-down government planning managers. Sustainable wetland use will only be achieved when wetland users are empowered and have clear rights as users and managers of wetlands themselves. This will require a supportive policy framework which includes security of access to wetlands, and provides appropriate incentives which make investing in the wetlands worthwhile. Figure 1.4 provides a schematic representation of these ideas.

Figure 1.4 *A people-centred approach for analysing the management of small inland wetlands in Africa*

The essential elements of a people-centred approach or paradigm include:

**People operating in a framework of society, policies and economic /social /cultural incentives;

**People's contribution is reflected in the institutions and coordinated management, economic and socio-cultural incentives, as well as policy;

**The critical interaction is how people and wetlands interact. This is influenced from both the socio-economic and the environmental aspects with their different characteristics;

**The nature of this interaction determines the outcomes in terms of:

 **ecological sustainability – the pattern of ESS;

 **economic sustainability – provisioning services, and others relevant to payment for environmental services;

****institutional sustainability - arrangements, policies and other aspects of socio-institutional organization.**

With reference to this framework, and with guidance from the literature reviewed above this book seeks to explore the experience with sustainable wetland management in a number of countries in several parts of Africa. In these nine case studies the following themes are central:

****the relationship between wetlands, livelihoods and local wetland management arrangements;**

****the different dimensions of sustainability (economic, environmental, social and institutional) which need to be integrated in wetland management strategies;**

****technical, institutional and policy elements which can be applied to support sustainable wetland management;**

****the need for wetland management strategies across a range of scales in Sub-Saharan Africa;**

****the importance of supportive policy environments for sustainable wetland management.**

The concluding chapter of this book reviews the lessons from these case studies and identifies how they may contribute to further elaborating the people-centred paradigm / framework presented above and identifying actions to help achieve sustainable management of inland wetlands in sub-Saharan Africa.

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