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Managing the impact of gold panning activities within the context of integrated water resources management planning in the Lower Manyame Sub-Catchment, Zambezi Basin, Zimbabwe

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Abstract

Riverbed alluvial gold panning activities are a cause for degradation of river channels and banks as well as water resources, particularly through accelerated erosion and siltation, in many areas of Zimbabwe. The lower Manyame sub-catchment located in the Northern part of the country is one such area. This study analysed the implications of cross-sectoral coordination of the management of panning and its impacts. This is within the context of conflicts of interests and responsibilities. A situational analysis of different stakeholders from sectors that included mining, environment, water, local government and water users who were located next to identified panning sites, as well as panners was carried out. Selected sites along the Dande River were observed to assess the environmental effects. The study determined that all stakeholder groups perceived siltation and river bank degradation as the most severe effect of panning on water resources, yet there were divergent views with regards to coordination of panning management. The Water Act of 1998 does not give enough power to management institutions including the Lower Manyame Sub-catchment Council to protect water resources from the impacts of panning, despite the fact that the activities affect the water resource base. The Mines and Minerals Act of 1996 remains the most powerful legislation, while mining sector activities adversely affect environmental resources. Furthermore, complexities were caused by differences in the definition of water resources management boundaries as compared to the overall environmental resources management boundaries according to the Environmental Management Act (EMA) of 2000, and by separate yet parallel water and environmental planning processes. Environmental sector institutions according to the EMA are well linked to local government functions and resource management is administrative, enhancing efficient coordination.

Keywords: Gold panning; Integrated water resources management; Small-scale mining; Consensus building; Conflict resolution; Environment

1. Introduction

The study was undertaken as part of an Integrated Water Resources Management (IWRM) demonstration project in Zimbabwe's Lower-Manyame Sub-Catchment (LMSC). The sub-catchment councils are part of the structures established under the water sector reforms in Zimbabwe, designed to provide for localised and stakeholder-based management of water resources (Manzungu, 2002; Jaspers, 2003). Under the Water Act, sub-catchment and catchment councils are responsible for the sustainable management of water resources within their management areas. These responsibilities are mainly within the context of IWRM planning for the catchments, and can sometimes

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bring them into conflict with certain economic activities that cause damage to the riverine environment. However, resolving such conflicts is essential to prevent river system degradation and the resulting reduction in use options for available water (Falkenmark, 1998).

One such conflict which can occur is that between the water management structures and small-scale alluvial gold mining or gold panning. This poverty-driven activity plays an important role in the socio-economic development of people in remote areas of countries in Southern Africa. Dreschler (2001) estimates that up to 2 million people from the riparian states directly or indirectly benefit from small-scale mining and alluvial panning of minerals within the Zambezi Basin, of which the Lower Manyame sub-catchment is part. Thus, the appropriate approach to the management of gold panning was to permit it in order to regulate it, instead of attempting to eradicate it. Across the world, attempts to regulate gold panning have failed (MMSD, 2002). If appropriate legislative measures are put in place, the impact of such activities can be reduced (Maponga, 2000). In this context, Zimbabwe has developed legal instruments designed to empower local authorities to control and regulate gold panning. Specifically, it is the responsibility of Rural District Councils (RDCs) to enforce SI 275 (Mining (Alluvial Gold) (Public Streams) Regulations of 1991).

Gold panning is largely an off-season occupation for peasant farmers and a full-time occupation for others (Shoko and Veiga, 2004). The activities are usually unlicensed. Panners generally work less than 50 tonnes of solid earth per person per month, with a monthly production of less than 100 g of gold per person. Panners generally utilise rudimentary forms of mining equipment and invariably exploit channel or palaeochannel placer gold deposits.

Panning operations are accompanied by massive damage to river systems. The hydrological system, and the ecosystem that it supports, are negatively impacted by physical and chemical damage. Physical damage includes the digging up of river channels, banks, paleo-channels and their flood plains as well as surface trenching using picks and shovels, resulting in hazards for humans, domestic and wild animals as well as reducing river frontage. (Shoko and Love, 2005). More than half the panners in the Zambezi Basin use the destructive horizontal tunnelling method of extracting gold, resulting in the collapse of banks and widespread erosion (Chenje, 2000).

The Chemical impacts include the contamination of river water with mercury and sometimes cyanide used in processing of gold (Billaud et al., 2004; Ramírez-Requelme et al., 2002). Kambey et al. (2001) established fish tissue mercury levels that were four times those recommended by the World Health Organisation because of about 200 tonnes of mercury that was used in illegal gold mining at Sulawesi, Indonesia. Further pollution problems are caused as riverside populations increase without provision of sanitation (Shoko and Love, 2005).

In addition to the destruction of habitat and loss of clean water sources, the ecosystem is impacted directly by panning activities. There is widespread deforestation, as vegetation is cut down to provide fuel for use while panning (Shoko and Love, 2005). The increase in population is often associated with increased poaching.

Environmental impacts of individual and isolated gold panning activities may not be necessarily significant but the accumulated impacts of numerous panning operations can create problems for both aquatic and terrestrial ecosystems. An isolated gold panning activity may require the involvement of many stakeholders in a catchment area. However, addressing these issues is complex. A number of studies have established that institutions that control or regulate activities dealing with natural resources are generally poorly coordinated (Wilkinson and Anderson, 1987; Margerum and Born, 1995; Nare et al., 2005). Thus there is diversity in stakeholders' orientation to resource management. Inconsistencies in government policies and objectives of different programmes and projects can reduce co-ordination in intra-governmental settings (Van der Zaag, 2005). It therefore follows that an attempt at managing the effects of gold panning activities on water resources must take into account the fact that the fragmented nature of existing legal and organisational frameworks contributes to the magnitude of negative human effects on the natural environment, which results in diminished environmental resource sustainability.

In this study, an attempt is made to determine how such issues can be addressed in a hot spot area for panning, the Dande valley in the Lower Manyame Sub-Catchment. The focus of the study was on the institutional relationships and the resolution of conflicts that might arise from the fragmentation of policy and organisational structures in the management of environmental effects of gold panning.

2. Study area

The study was undertaken in places that were affected by small-scale riverbed mining along Dande River and its tributary, the Mupinge River in the Lower Manyame sub-catchment (Fig. 1).

The river springs from the Horseshoe mountain range in upper Guruve (1500–1800 m above sea level) in the Guruve highlands that mark the Guruve Rural District Council administrative boundary to the East. The Dande River then drains through the escarpment and Rukovakuona Mountains into the Zambezi valley, ultimately to its confluence with the Manyame River at Mushumbi village. The Dande and Mupinge Rivers are semi-perennial rivers with surface water flow occurring only in the rainy season.

Socio-economic activities include farming, wildlife management, mining as well as small-scale alluvial gold panning and riverbed mining among others. Wildlife is restricted to the Doma area in the west where there are occurrences of tsetse flies (*Glossina morsitans*) as well as malaria-bearing mosquitoes (Coig et al., 2001). Bilharzia is also reported to be a result of stagnant pools in the area generated by riverbed panning.