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<b>Mission Reference</b> 2006 C3 T 19 M4		<b>Date:</b> October-November 2006

## Mission Report

### Expert Name and Function

Dr Robert Britton, Fisheries Officer for the UK Environment Agency

### Wording of Mission:

To ascertain the potential for on-shore aquaculture in the River Malewa Basin, Kenya.

### 1) CONTEXT

#### Place, Location

Kenya, Rift Valley Province River Malewa basin, Naivasha. Lake Naivasha Riparian Association offices, field locations and the Naivasha District Fisheries Office.

#### Mission duration

One month

### 2) BACKGROUND TO THE MISSION

The principal fishery in the River Malewa basin is on Lake Naivasha where licensed fishermen exploit the fish stocks on a daily basis, with the exception of a close season between June and October. Despite the fishery being heavily regulated by the Naivasha Fishery Department, there has been a steady decline in catches since the 1980s and today catches remain very low, a result of prolonged over exploitation and habitat degradation preventing stock recovery. Given that the human population around the lake is expanding rapidly, the fishery is under increasing pressure to meet the local demand for fish. Unregulated fishing by poaching is commonplace.

As it is apparent that the fish stocks cannot withstand the exploitation pressures on them, then the development of on-shore aquaculture facilities may provide a more sustainable option. This mission was to identify the potential of on-shore aquaculture in the River Malewa Basin to provide a sustainable source of fish. In doing so, the pressure on the fish stocks of Lake Naivasha will lessen and stocks potentially recover to former levels.



**3) OBJECTIVES**

Initial Objectives	Results	Results Indicator
<p>1. Assess potential of sites in the Malewa Basin to enable development of aquaculture facilities</p>	<p>Areas of the Malawi Basin are already used for agriculture, especially in areas close to sources of water (e.g. streams, rivers, boreholes) as this allows irrigation of crops in an area with unpredictable rainfall. With cultivated areas close to adequate sources of water, then undeveloped sites are available for the construction of aquaculture facilities. In terms of size, an area of 2.5 ha could be developed to provide a facility of approximately 45 ponds, depending on the size of pond preferred. Such a facility will provide fish farmers with a site suitable for the culture of a variety of species across their different life stages</p>	<p>There are numerous sites that could be used for on-shore aquaculture in the basin. Although in private hands, with liaison with land owners, considerable potential exists for development of aquaculture sites of varying intensity</p>
<p>2. Identify suitable fish species for on-shore culture</p>	<p>There has already been some aquaculture activities in the Basin and this has lead to escapes of non-indigenous species into surrounding waters. An example is the common carp <i>Cyprinus carpio</i> L. that was washed out of an on-line facility on the River Malewa and into Lake Naivasha where it has established a sustainable population (Hickley <i>et al.</i> 2003; Britton <i>et al.</i> 2006). Given the potential of escapes, particularly during flooding during heavy rains, it is recommended that species indigenous to the basin are utilised in culture facilities. If these species are not feasible for culture, then species indigenous to East Africa should be used. It is recommended that culture systems are developed only for species that feed low down in the food chain used as these will provide the low-cost products favoured by poorer rural communities, both in terms of initial investment and subsequent market value (Muchiri <i>et al.</i> 2004). Suitable species will include tilapia species and the catfish <i>Clarias gariepinus</i>. These species are already used in aquaculture facilities around the World</p>	<p>The objective of identifying species suitable for use in on-shore aquaculture facilities in the River Malewa Basin was successful</p>




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<p>3. Identify training resources for local people to ensure skilled personnel are used on developed aquaculture sites</p>	<p>Moi University in Eldoret was identified as centre that could provide people within the basin with the skills required to successfully design and run a successful aquaculture facility. A demonstration, teaching and research fish farm has been constructed and this is the largest facility of its kind in East Africa.</p> <p>The Moi University Fish Farm fulfils a number of roles (Muchiri <i>et al.</i> 2004):</p> <ul style="list-style-type: none"> <li>• To be a practical facility in support of fisheries students studying aquaculture;</li> <li>• To act as a demonstration unit to promote the potential of freshwater fish farming to community leaders, government officials, extension workers and entrepreneurs, achieved through practical training courses, visits, 'open days' and the dissemination of information;</li> <li>• To serve as a regional centre for research into appropriate aquaculture methods and for the development and assessment of equipment, feeds, husbandry practices, etc., including economic evaluations of production methods;</li> <li>• To function as a supplier of juvenile fish to farmers in the region to both generate local revenue and assist fish farming development;</li> </ul> <p>To provide applied research opportunities for faculty members and visiting scientists</p>	<p>An established facility was identified that has the infrastructure to assist aquaculture development in the River Malewa Basin.</p>
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#### 4) ACTIVITIES DEVELOPED during the mission

Activity 1	Topic: Institutional, Communication
<p><b>Description</b></p>	<p>Small-scale fish farming (FAO 1999) has had many false starts in sub-Saharan Africa and this dates back to the beginning of the twentieth century. Pessimists still consider aquaculture to be a risky enterprise producing low yields of fish and a poor economic return on cash and labour investments. Likely reasons include lack of experience in fish breeding and slow uptake by farmers of the technology of pond fish production. In Kenya, fish farming has a history of more than 50 years, yet the culture of tilapia and catfish remains primarily at subsistence level only. The potential for economically viable and sustainable aquaculture has remained largely unrealised.</p> <p>To remedy this, inexperienced farmers should have:</p> <ul style="list-style-type: none"> <li>• access to appropriate technology,</li> <li>• access to key resources including information, materials and money,</li> </ul> <p>and understand relevant policy, legal and institutional frameworks relevant to the activity.</p> <p>This can only be obtained through institutional involvement to disseminate the information.</p>

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<b>Activity 2</b>	<b>Topic:</b> Community inclusion
<b>Description</b>	When aquaculture sites are developed in the Basin, it is recommended that the approach adopted by Moi University is utilised. During construction of the farm, manual labour was used rather than earth-moving machinery,. This provided the benefits of local income, experience, a sense of ownership and a ready market for the fish produced. Therefore, development of community based schemes encompassing all aspects of the site development (legal aspects, regulatory frameworks, frameworks, training etc) are recommended.

#### **4. LESSONS LEARNED during the mission**

##### **About methodology**

The methodology used was dependent upon establishing contacts with key people in each sector (Moi University, Naivasha Fisheries Department etc). In a country such as Kenya where the transport infrastructure can be unreliable, preparation in advance of the mission was as important as the mission itself. Therefore, the lesson learnt was that identification of key contacts early on in the mission, or even before it starts, will reap benefits at its conclusion.

##### **About practice:**

An important lesson learnt was that a number of people within the Basin were already skilled aquaculture practitioners and there was an existing teaching facility in the locality. However, poor communication networks and cost of transport often prevented freedom of this knowledge and was inhibiting all aspects of aquaculture development. Realising that success would be more dependent upon establishing networks between these groups, rather than bringing in and developing new skills was important. Therefore, the lesson learnt was the importance of empowering of local people to develop new sites, rather than bring in labour and skills from afar.

#### **5. DISSEMINATION (opportunities and difficulties)**

- **The basin organisation the expert belongs to**

Most of the activities developed and lessons learnt have application to my own basin. Although in the UK aquaculture development is now very advanced and a supporting infrastructure is in place, much of the industry is reliant upon alien species and utilise systems that require significant resource and energy input that may prove unsustainable in the longer term. A shift to systems of lower intensity that utilise polyculture and based upon UK species (similar to that proposed for the Malewa Basin) would prove a sustainable solution and potentially allow the business to sell products as organic produce.

- **National IWRM practice**

The Kenyan Government's fishery department could utilise much of the advice provided in order to provide a network of aquaculture sites utilising sustainable ideals. Kenya's capture fisheries on lakes such as Naivasha and Victoria have to support huge numbers of people - economically, socially and for food - yet these fisheries appear to be in rapid decline. Decreasing reliance on these fisheries through aquaculture development would enable diversion of resources from attempts to preserve valuable fish stocks to alternative areas of resource management.

- **Regional Experience**

At a regional level, the lessons learnt will be very important, for it will require development at this level in order for schemes to be initiated and be successful. Within the Malewa Basin, development at a regional level would be fundamental in ensuring practitioners were able to access the support they require.

- **Worldwide**

Demonstrating that sustainable aquaculture practices in a developing country are able to decrease the pressure on natural capture fisheries would provide an excellent case study for other countries to follow. Many capture fisheries around the globe are experiencing problems similar to the Kenyan experience and so solutions based on sustainable aquaculture should be very important.

## **6. IDENTIFIED TIPS**

Throughout the exercise, it was apparent that despite there being infrastructure to assist people interested in developing on-shore aquaculture facilities, this was not being utilised effectively due to poor communication between relevant parties. For aquaculture schemes to develop successfully in the Malewa Basin, it is essential that a central body is established that can provide advice on, for example, finance, costing, equipment, training, species to culture and their availability, and best practice guidelines. This body would not necessarily have to be restricted to the Basin but could be utilised across the whole of the country.

Therefore, the principal tip I would give to the Malewa River Basin, and indeed to any other basin that aspires to develop on-shore aquaculture schemes to supplement fish catches in natural fisheries, is to ensure that any interested party has access to all the assistance that they require for their scheme to be successful. The establishment of a central body to do this would be a logical step.

## **7. PERSONAL COMMENTS**

This exercise proved to be extremely valuable in regards to both identifying possibilities for aquaculture in the basin, but also in demonstrating to interested parties the possibilities that already exist and the facilities that are available for their use at Moi University. Given the reliance of many of the population on fisheries on the Rift Valley Lakes, and the perilous nature of these fisheries in regard to large fluctuations - and declines - in stocks, then a sustainable option is required. It was apparent that a realistic option is on-shore aquaculture utilising regional fish species in systems that provide high returns for low investment.

## **8. CONTACTS**

Mr. J. Ng'eno: Naivasha District Fisheries Officer; Naivasha Fisheries Office, Lake Road South, Naivasha, Kenya

Dr. M. Muchiri; Department of Fisheries, Moi University, Kenya

## **9. BIBLIOGRAPHY**

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