Chapter IX: Conclusion and recommendations

The research questions -as formulated in chapter II- will be answered in this chapter, albeit not in a numerical order. The answers will be subsequently referred to as (Rq + number) that was assigned in chapter II.

The research centred on a particular kind of wildlife-human conflicts viz. conflicts between people and hippos along the densely populated shores of Winam Gulf, Kenya. Conflict situations have been clearly defined in terms of causes, manifestations and effects. The first chapter served as a framework to position the topic of the research and introduce related concepts and their development. It touched upon many issues: environment, development, biodiversity conservation, and access to natural resources. Many items are interdependent: conservation e.g. cannot ignore human needs while development cannot ignore environmental limits. Safeguarding the environment asks for a holistic, participatory approach which considers broader issues of rural development. Local people often thought that wildlife was being conserved at their expense. Several respondents showed their discontent when they argued that ‘the government values its animals over its wananchi’ (citizens).

In Kenya, wildlife is under public trusteeship through government ownership and management by the Kenya Wildlife Service. Parks and reserves accommodate around thirty percent of Kenya’s game populations. Outside protected areas wild animals are under public tenure while their habitats are not. Individual ownership of land restricts animal movements, particularly when people fence their land. In the lake region many people had already received their land title deed or they were about to receive it. As a result of human encroachment upon former wildlife habitats the space left for animals is decreasing. On the one hand wild animals need the land to survive, on the other humans need the land to make a living. The conflicts over space have intensified due to relatively high human population growth rates. A similar situation applied to hippos in the lake region.

Hippos in terms of numbers, habitat and behaviour

In a countrywide research that was conducted in 1979, the number of hippos in Lake Victoria was estimated at 1,500 -the estimated density came to 2.5 hippos per km. There were no recent reliable hippo counts in Winam Gulf. Estimates provided by respondents widely diverged from 1-150 animals in different sub-locations. The largest hippo groups were observed by respondents in the Kano Plain (Kisumu). Rough estimates given by KWS-officers referred to separate districts: hippo numbers ranged from 200 (Kisumu) to 1200 animals in Siaya (Rq1b).

The officials interviewed thought the number of hippos had gone down. The main causes for the decrease were hunting or poaching, legal killing by rangers, the destruction of hippo habitats, the increase in human activities along the shores of the lake, and the infestation of the lake with the water hyacinth. It was assumed that respondents would also opt for a decreasing trend as well. However, sixty percent of the sample referred to expanding hippo numbers, mainly due to natural increase and
the protection offered by the government. Their reaction is to some extent understandable: local people are not allowed to kill hippos for the species is legally protected, and hippos have few enemies besides man. A perceived reduction in hippo numbers was primarily attributed to hippo migration brought about by hunting, interference and habitat destruction (Rq1c).

Hippos inhabit wetland areas. Along the shores of Winam Gulf they can be found in scattered groups, preferably in relatively shallow areas with weak swells. The gulf has a long indented, rather swampy shoreline with many shallow bays. A large part of the shoreline is fringed with vast stretches of papyrus, especially in Kisumu and Siaya. These habitats are suitable to hippos. Being amphibious herbivores, they are necessarily confined to wetlands, which provide adequate grazing grounds within a few kilometres of the daytime resting sites. Hippos undertake nocturnal ventures ashore to feed on grasses -or crops whenever palatable grasses are not available. Hippos were supposedly feeding on water hyacinth; there is no proof for such behaviour though. The animals tend to stick to favoured parts of lakes, where tenures have been known to last at least eight years -this was also the case in the research area. The size and quality of hippo territories depend on ecological conditions (Rq1a, Rq1d).

Linking hippos to conflict situations requires knowledge of their distribution pattern and behaviour. The variable group composition of hippos mainly consists of schools (females, calves or juveniles) and bachelor groups (mainly bulls, possibly a few cows). A solitary ‘peripheral’ male may challenge a territorial bull in order to obtain a territory in which he has exclusive mating rights. Peak conceptions occur towards the end of the dry season. At such times bulls are most likely to fight and levels of aggression are high. Female hippos give birth either ashore or in shallow water, away from the herd. The cow is very protective: she will defend her young against any threat. Most calves are born during high rainfall months. In accordance with the bimodal rainfall pattern in the lake region, the peak of hippo births occurs most probably in March/April and September/October.

Hippos have an unpredictable nature. They may upset small boats and have been known to attack and kill people who incidentally block their access to water or get between a mother and a calf. Nonetheless, hippos rarely attack people on dry land unless provoked. In spite of their heavy build, they can outrun a man on land for short distances. High levels of aggression are likely to prevail when the hierarchical system of hippos is temporarily disrupted for instance as a result of intense hunting. On such occasions or when females have recently given birth, there is a good chance of a close encounter.

Hippo-human conflicts

The preceding section referred to close encounters with hippos. Hippo-human conflicts occurred predominantly in the area adjacent to the lake and near river mouths as well. Incidents seemed to be most common in Kisumu, where hippos have a vast expense of papyrus at their disposal. The area is relatively flat and the hippos can come out at different sites. In Rachuonyo, the range of hippos is more restricted. The area near Homa Hills is mountainous. Even though hippos are capable of climbing steep slopes, they generally prefer staying in the relatively flat area next to the lake. People who lived uphill often had shambas bordering the water. Both in Siaya and Suba there was a mixture of sites: some were hilly while others were relatively flat (Rq2a).

Conflicts related primarily to agriculture and fisheries. Livestock was sometimes chased or attacked by hippos. The possible transfer of diseases from hippos to cattle was mentioned in addition to injured or killed domestic animals. Fishermen primarily faced the destruction of nets and to a lesser extent boats. They were sometimes chased by hippos, or found their route blocked when they went fishing or had just returned. Fishermen in Suba encountered many problems. Problems with hippos were least recorded in Siaya, on the side of fisheries as well as agriculture.

Conflicts were specifically intense in the field of agriculture, which is the main economic activity of people living near the gulf. These losses primarily concerned maize, sukumawiki and sweet potatoes -crops which are said to be among hippos’ favourite diet components. Nearly 80% of the farmers in the sample suffered crop losses due to hippos; particularly farmers in Kisumu were hit. Most incidents took place during the rainy season. Losses of cereal crops were recorded especially in April and May. During these months hippos also destroyed root crops like sweet potatoes or arrowroots, and legume crops like sukumawiki; additional damage was done from July/August onwards. Fisheries-related losses were more spread throughout the year, with an emphasis on April-September (Rq2c, Rq2e).

The four key sources of wildlife-human conflicts in Kenya have been discussed in chapter III. All keys relate to hippo issues, albeit to a different degree. The lake region is not a major tourist attraction: the area accommodates few national parks and the infrastructure is poor. Therefore tourist-related problems are less relevant. The fast growing human population makes an increasing demand on natural resources. Wetland areas in the lake region have been partially reclaimed for agricultural purposes, and wetland products like papyrus are being utilised to a large extent. Wetlands are prone to disruption by human activities. Hippos were severely hit by the destruction and/or modification of wetlands because they lost part of their hiding places and grazing grounds.

The land bordering the lake was being transformed into ‘one huge shamba’. The expanding cultivation along the shore also included the buffer zone, where cultivation is not allowed in order to protect the watercourse from pollution and erosion. The act is not enforced and few people respect it. Pressure on the land next to the water is correlated with the semi-arid character of the shore region. The land bordering the water is relatively fertile; it is seen as the only suitable place for the cultivation of
vegetable crops. The rainfall reliability in the shore region is relatively low. Crop yields are widely diverging. The lack of rain had a severe impact on Suba District, where maize was distributed as relief food in 1997.

Farmers are not the only ones who use the fringe of the water. People go there to fetch water, take a bath, wash their clothes etc. Livestock is taken to the lake to drink and graze. Fishermen put their nets along the shores and have established fish landing beaches. Young people have increasingly turned to fishing - there are few economic alternatives in the region. Fishing methods have changed over the years; some more recent methods involve the use of lights. Fishing has turned into a ‘continuous’ activity. Declining average catches might tempt fishermen to go to hippo sites where fish is likely to be abundant. Due to these developments safe resting places for hippos may become scarce (Rq2b).

It is highly likely that hippo-human conflicts have intensified over the years. The number of incidents with hippos in the field of fishing and agriculture supposedly expanded. The increase in crop-related incidents outnumbered incidents in fisheries. This was primarily attributed to population growth in the location and the accompanying expansion of shambas next to the lake. Respondents occasionally correlated the perceived expansion of hippo numbers with the rise in incidents. KWS-officers also pointed at more incidents on crops. Opinions with regard to fishing differed. On the one hand it was thought that fishermen had learned how to avoid hippo areas (lower incident rate), on the other fishermen increasingly interfered with hippos areas due to the commercialisation of fishing (higher incident rate) (Rq2d).

Attitudes towards hippos and the issue of conservation
Not surprisingly, most respondents regarded hippos as problem animals. To them, hippos meant crop destruction, human injuries or deaths, and interference with fisheries. Local people seldom regarded the presence of hippos as beneficial. To many people the hippo represented nothing but a nuisance: they could not a dangerous animal of that sort and would not mind its full disappearance from the area. In spite of the overall negative attitude there were also people who regarded the species in a more positive way. They mainly referred to hippo meat, tourists and fish abundance near hippo sites. Tourism was rarely linked to local employment; the government was depicted as the overall beneficiary. Items like hippo meat, its skin and teeth were mainly valued in the past; some items had a specific meaning in ceremonial activities. Nowadays hippo parts are difficult to obtain and they are valued to a lesser degree (Rq3a, Rq3c).

Hippos obviously had a specific meaning in Luo-society: the animals were associated with traditional beliefs and clans that had a particular interest in them. Sometimes new-born children were named after hippos. Hippo-related beliefs were prevalent throughout the lake region. There is a link between such beliefs and the local perception of hippo control. Stories were told about wizards who were running around with hippos. In case the wizards heard about the arrival of the KWS-rangers, they would hide the animals until the rangers decided to leave the area. This argument was often used to explain why rangers frequently failed to find hippos when they were carrying out patrol work. Hippo control was often regarded as inefficient as the problem remained unsolved.

The KWS-officers did not specifically label hippos as troublemakers. Instead, humans were seen as intruders in hippo areas: cultivation up to the water front resulted in little grazing space for hippos. The lack of information on both hippo numbers and the extent of the damage they cause hampered a proper characterisation of hippos. To some extent hippos were seen as problem animals because they interfered with crops. It was said that the problem could be manageable if there had been sufficient resources to improve control operations and provide community education (Rq3b).

With the negative attitude of respondents in mind, it was more or less assumed they would oppose the conservation of Kenya’s hippos. However, most people favoured hippo conservation. For some reason hippos were meant to be there and thus had to be saved for the posterity. The presence of hippos was sometimes linked to fish abundance. However, most people were not aware of the meaning of hippos. The government or KWS were held responsible for all wildlife matters. The involvement of local communities in conservation issues was hardly ever mentioned (Rq2d).

Education could contribute to an increasing awareness of hippo’s role in the ecosystem. The realisation of its importance could trigger a change of attitude towards the animal. Their conservation is highly significant to the functioning of wetland ecosystems, in which the hippo is considered a keystone species or an ecosystem engineer. The meaning of hippos has been introduced in chapter I and elaborated in chapter V. Hippo trails on land facilitate access to water bodies for other animals; in the water hippo movements may prevent the blocking of water courses. Hippos may also contribute to the prevention of fires through their way of grazing. Their dung is specifically important. Hippos are terrestrial grazers, which mostly defecate in the water. They produce huge quantities of dung that form the nutrient base of a food chain. Hippo movements stir up the mud and thus release nutrients. Microscopic plant life and fish species thrive when hippos are around. Fish abundance is highly important to the local communities living around the gulf. Fish means more than just food; the fishing industry employs many people in a region where alternative economic prospects are limited (Rq1e).

Attitudes towards hippo-human conflicts
Even though local people were warned not to go near hippos and announcements were made in barazas whenever a rogue hippo was around, individuals had to protect their own property. In order to prevent or reduce hippo induced damage, farmers used a number of devices to ward hippos off. They mainly used local fences and/or trenches to protect crops. Contrary to trenches, fences were not regarded as highly effective means. Trenches had a serious drawback: they were labour-intensive and demanded...
constant maintenance. Barbed wire attached to strong poles was considered most effective. However, few farmers could afford this device.

The methods of protection represented site-specific applicability. Trenches were predominantly dug in Rachuonyo; respondents in Kisumu did not apply this method, presumably because of the waterlogged soil. Local fences made out of local trees or sisal were erected in all districts; especially in Suba fencing materials seemed to be widely available. Respondents in Siaya were the only ones who put thorns in between crops. Watching at night was carried out especially in Kisumu and Suba; it was often used in combination with other devices such as fire, torches or tins to make noise. Protective means were mainly used on an individual basis. Except for the horticultural gardens on Rusinga there were no communal efforts to protect crops. The women groups involved had acquired financial assistance from donors (Rq4b).

People reacted in different ways to hippo-induced damage. Sometimes bad experiences with hippos made them switch jobs or opt for a different method of protection. Occasionally shambas were left idle because hippos frequently invaded them. Some people decided to grow different crops, which were less favoured by hippos: they no longer cultivated maize but turned to sorghum instead. Generally there were fewer problems with sorghum; hippos were said to interfere with tender sorghum only.

When people experience damage caused by hippos, they are supposed to report these losses to the authorities. The respondents’ reluctance to report was striking: out of 174 incidents only 85 losses were reported - a rate of 48.9%. The low rate of report may indicate that the extent of the problem is severely underestimated. The reluctance to report losses could be attributed to a lack of confidence in the wildlife authorities. Reporting was regarded as a waste of time and money. Travelling to one of the KWS-stations -in Siaya, Homa Bay or Kisumu- was costly, and rangers required money to cover their expenses. These statements from respondents were strongly objected by the KWS-officers (Rq4a).

The high discontent with the wildlife authorities was related to problem animal control in the field and the disbursement of compensation claims. Hippo control was judged unfavourable: rangers did not respond to calls or showed up late. In case of several unanswered calls, local people sometimes decided to take the matter in their own hands and kill hippos illegally. Detailed descriptions of such practices were incidentally given. It was often said that the rangers who attended the reports either did not see the hippos or tried to scare them by firing in the air. Eventually, the hippos would return and start interfering again. With regard to patrol work, the KWS seemed to lack staff and equipment. Problem animal control was mainly carried out when the damage had already been done; it was hardly ever used in a precautionary way (Rq4d).

Compensation fees were granted for injuries or deaths caused by wildlife. The necessary procedures had severe shortcomings: they were highly bureaucratic, payment could take years, and the amount was generally considered to be insufficient. The payment of compensation for crop losses was abolished in 1989 due to misuse and escalating wildlife-human conflicts -the government simply faced too many claims. The awareness of compensation requirements seemed to be low. Many people thought that the KWS disbursed payments, while this is done by the Treasury. Respondents often relied on information given by local chiefs, which was sometimes outdated or restricted. None of the respondents was compensated, not even the person who was severely injured by a hippo in 1991 (Rq4a).

It is often stated that voices of local people have to be heard, specifically when decisions are to be made which have an impact on their situation. This is true. In this thesis, the respondents are among the people who live with hippos on a day-to-day basis, who know hippo sites, who tell interesting stories about the animals etc. They are the ones who experience feelings of fear during unexpected encounters with hippos, and are fed up with hippo-induced damage. When respondents were asked to come up with possible ideas to mitigate conflicts, they showed a strikingly awaiting attitude. They mainly expected the government to provide financial or material support for a proper fencing of the shambas or the establishment of a hippo park. One official ascribed the respondent attitude to the influence of the government by saying that the people were reluctant to come up with the truth out of fear for repercussions. Indeed, some respondents had to be insured that carrying out research had nothing to do with the government (Rq4c).

Some people said that the KWS had to put offices near the beaches in order to have a more permanent and efficient control of hippos. These suggestions were not new. Similar recommendations have been found in the minutes of meetings of officials at different levels. This could be one of the main problems. Even though hippos are frequently depicted in the national newspapers as notorious crop raiders and animals which keep on harassing people, the situation in the lake region received little attention. Political pressure to change the situation seemed to be lacking, most likely due to a ‘double isolation’. The area bordering the gulf is a relatively remote area. Most of its inhabitants are Luo, a tribe which has been in the opposition for years. Funds directed towards wildlife-related problems were incidentally given. It was often said that the rangers who attended the reports either did not see the hippos or tried to scare them by firing in the air. Eventually, the hippos would return and start interfering again. With regard to patrol work, the KWS seemed to lack staff and equipment. Problem animal control was mainly carried out when the damage had already been done; it was hardly ever used in a precautionary way (Rq4d).

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Dealing with wildlife-human conflicts is obviously not a priority issue. Given the political setting and the economic situation in Kenya, what kind of measures can be taken to resolve wildlife-human conflicts? Several recommendations have been made with regard to conflict situations between hippos and wildlife, either directed at avoiding or minimising conflicts. Ideas brought forward mostly referred to proper methods of protection -which are unfortunately relatively expensive- and the establishment of hippo areas or hippo farms. This option certainly deserves attention and advanced research.
If hippos are to have a secure future within the research area, then there has to be an option of hippo-human cohabitation. Education could bring about a change in the currently hostile attitude towards hippos. Local communities should have a say in the development of conflict mitigation strategies. Both actors have to benefit. There is no other way (Rq4e).

**Recommendations**

1. A hippo census in Lake Victoria area is required. Due to its costly and time-consuming character, a census was beyond the reach of this research. A proper census is one of the components needed to determine the carrying capacity of a given area with regard to hippos. Ideally, research on hippo-human conflicts should have an interdisciplinary character so that all relevant aspects e.g. biological and socio-economic are well looked into.

2. Finding conflict mitigation strategies requires a clear view of current conflict situations between hippos and humans. Records should contain data on the numbers of crop raid complaints, hippopotamus killed or wounded, unanswered calls, and the location of calls. Such information would be useful when drawing a map of the distribution of hippo problems. The KWS has this kind of data at its disposal, even though scattered, inaccurate and incomplete. The system of reporting and keeping data needs to be improved. When the problems are categorised for each location in terms of calls per period of time, then control operations could be more tuned to areas where the rate of calls is highest. There is an elephant database, which is being maintained at the KWS-headquarters in Nairobi. Why can’t there be a similar database for hippos?

3. A hippo farm is an option that definitely deserves further research.

4. Education should be more valued. It is needed to bring about a change of attitude towards hippos, and make people more environmentally aware. Reaching the public is difficult though. Communication is generally poor at all levels, and *barazas* are poorly attended. Therefore the Partnership Department of the KWS should have extension officers who contact communities on a regular basis. Local people should be informed about their options, which should be realistic. They have to know what they can do with the means that they have at their disposal.