

KOGYAE STRICT NATURE RESERVE

DEVELOPMENT AND MANAGEMENT PLAN

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WILDLIFE DEPARTMENT
ACCRA

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DEVELOPMENT AND MANAGEMENT PLAN FOR KOGYAE STRICT NATURE RESERVE

PREFACE:

As part of the Economic Recovery programme, the Government of Ghana negotiated for a loan from the World Bank to help restructure the Forestry Sector of the country. Part of this loan was given to the Wildlife Department (WD) to systematically evaluate its conservation strategies to meet world standards. This amount (5.12 million US dollars) was to be used for infrastructural development, purchase of vehicles and equipment, training and the development of management plans for selected protected areas in the country. WD then contracted IUCN (World Conservation Union) to provide technical assistance towards the development of these management plans as well to review the Wildlife Policy.

The Kogyae Strict Nature Reserve was established with three main objectives:

- 1) to retain the transitional vegetation and faunal types for scientific research and monitoring;
- 2) to protect the watersheds of the tributaries of Sene and Afram Rivers and
- 3) to preserve the historical grounds of the Kwaman, Agogo and Kumawu people; where their last victorious battles against the Chumbulus were fought.

It is apparent that the reserve has not achieved the objectives for which it was established. Natural processes have not been allowed to prevail without interference from man in the form of farming, hunting, logging and charcoal production.

Until such time that the legitimate demands by the indigenous people for land for their farming needs is met and their involvement in the management of the reserve is guaranteed, the degradation of the reserve's resources will not be curtailed.

It is realized that the implementation of the proposals in the plan will not be effected immediately. It is also understood that no research or monitoring programmes have been initiated for the only Strict Nature Reserve in the country. Proposals will, therefore, be made to resolve the antagonism and misunderstanding between the indigenous communities and WD to allow the regeneration of the degraded vegetation of the reserve to take place as well as the development of programmes for the efficient management of the reserve. These programmes will reflect the overall development strategies in the Afram Plains.

SUMMARY:

The management plan presented here is a collaborative effort between the staff of WD and IUCN Technical Assistants. The Kogyae Strict Nature Reserve is one of the two protected areas situated in the transitional zone and afford an excellent venue for monitoring the environmental changes in the country. However, it has suffered from a lack of management direction and, therefore, has not been able to achieve the objectives for which it has been established. This management plan seeks to address these shortcomings and provide guidelines for the development of the reserve.

The management plan is divided into five sections. Section one outlines the national and regional setting of the reserve as well as the socio-economic context of the communities surrounding it: section two describes the bio-physical status of the reserve; section three looks at the current managerial practices taking place in the reserve; section four outlines the

development and managerial proposals based on the specific objectives of the reserve; and section five gives the integrated development programmes for the reserve and the local communities. The last section takes into consideration the socio-economic and developmental needs of the local communities and programmes proposed to meet these requirements.

MAJOR FINDINGS:

Flora:

105 plant species, made up of 57 trees, 10 shrubs, 9 climbers, 17 herbs and 12 grasses have been recognised in Kogyae Nature Reserve. According to the vegetation report by Schmitt and Adu-Nsiah, four main plant communities are found in the reserve.

1. Transitional Forest:

This vegetation type is found between the true forest and Guinea Savanna Woodland. The remnant Antiaris-Chlorophora forest is presently degraded due to the combined effect of farming, annual bushfires and logging.

2. Riparian Woodland:

This is made up of dense woodland, up to 12m high, and found along the seasonal rivers and streams that flow into the Afram and Sene rivers.

3. Guinea Savanna:

This type of vegetation surrounds the transitional and riparian forests in the reserve.

4. Boval Vegetation:

This vegetation is restricted to areas in the reserve where rock outcrops of sandstone and lateritic ironpans occur. The main vegetation consists of herbs, sedges and grasses.

Fauna:

The two most detrimental activities to wild animal populations in the Kogyae Strict Nature Reserve are poaching and cultivation of food crops, particularly yam and maize. These together with the annual bushfires, timber felling, charcoal production and intense poaching, have resulted in the presently low animal population levels in the reserve.

However, there are still reasonable representations of various species peculiar to forest and savanna habitats. These animals include black and white colobus monkey, red river hog, buffalo, waterbuck, bushbuck and grasscutter. Species of special interest include the roan antelope and hartebeest which used to inhabit the reserve but were not observed during the present study. These could be reintroduced after the squatters have been ejected from the reserve.

Socio-economics:

The socio-economic concerns in this reserve have been brought about due to improper acquisition of land for the extension on the north-eastern and southern parts of the original Kujani Bush Forest Reserve. The indigenous inhabitants do not, therefore, recognise the extension and continue to lease the land for farming and settlement. The present boundary also passes through three of the indigenous settlements, with the results that some of the inhabitants in these settlements live in the reserve. For them to recognise the extended boundary, the inhabitants of the three communities have agitated for part of the reserve to be demarcated for their farming activities. Once this is done, the indigenous chiefs will withdraw their support for the squatters within the reserve to facilitate their ejection. About 1,377 people, representing 20% of the total population that relate to the reserve reside and work in the reserve. These are made up of one indigenous village and a number of squatter settlements,

the largest of which is the Dagomba village. Their farming methods have degraded the vegetation at such an alarming rate that unless they are removed within the shortest possible time, the relatively undisturbed forest and Guinea Savanna will be completely gone within the next two years.

MAJOR RECOMMENDATIONS:

1. Establishment of four management zones to ensure the protection of the relatively undisturbed Kujani forest and the Guinea Savanna in the northern section of the reserve, to provide conditions for the regeneration of the degraded vegetations and to take care of the farming needs of the indigenous communities of Berem, Cherease, Chechebon, Aframso No 1 and Sasebonsu.
2. Provision of a permanent source of water by the construction of two dams in the degraded section of the reserve.
3. Pillaring of the boundary line to avoid it being affected by the periodic changes in the Dome-Oku-Aframso roads.
4. Resettlement of the squatters residing in the reserve to avoid further degradation of the vegetation and to enable the regeneration of the degraded areas as well as restoration of population levels of resident animals.
5. Establishment of channels of communication between WD and the District Assembly, and the local communities. Conservation education is the key to the success of the Kogyae Reserve.
6. Establishment of a mini research centre at the headquarters of the reserve at Dome camp for the monitoring of its resources.

SECTION ONE

1.0 THE NATIONAL AND REGIONAL SETTING

This section of the plan highlights the socio-economic aspects of the communities within the immediate vicinity of Kogyae Strict Nature Reserve (KSNR).

1.1 LOCATION AND GENERAL DESCRIPTION

The presently 386km² Kogyae Strict Nature Reserve lies in the north-eastern part of the Ashanti Region. It is centred on 1°05'W /7°15'N in the Afram Plains, (see Map 1). The Kogyae Strict Nature Reserve lies 25km South-east of Ejura and 50km North-east of Mampong. It is the only reserve designated as a Strict Nature Reserve and one of the two reserves situated in the transitional vegetation zone between the guinea savanna and forest regions of Ghana.

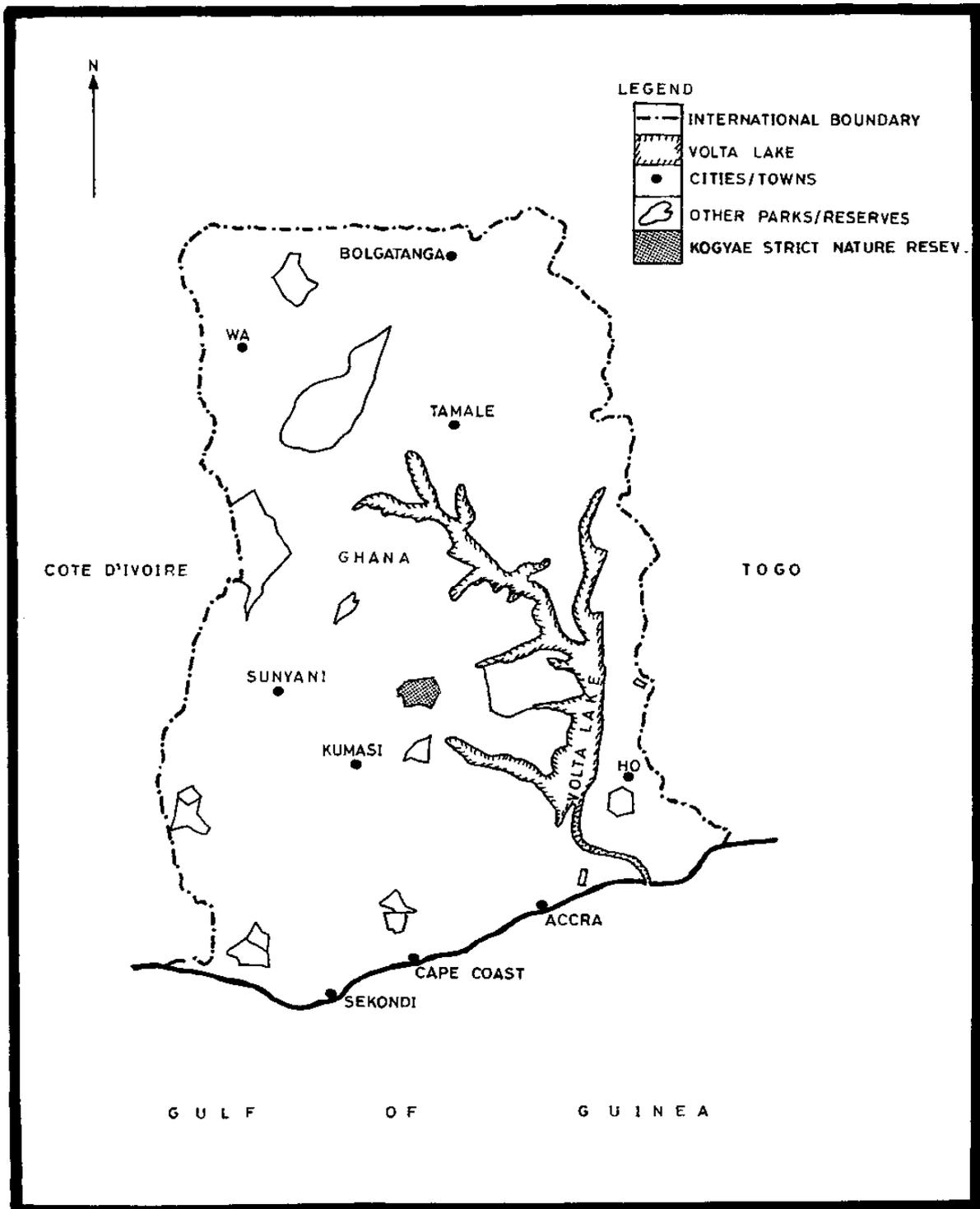
1.2 ESTABLISHMENT AND LEGAL STATUS

Part of Kogyae Strict Nature Reserve used to be the Kujani Bush Forest Reserve under the Forestry Department in 1967. This forest was one of the major battlegrounds of the people of Kwaman, Kumawu and Agogo, where their last victorious battle was fought. The reservation of this area at that time was to preserve this historic battleground for future generations, protect the watersheds of the tributaries of Sene and Afram rivers and to provide timber products. However, the area was still used for hunting, subsistence farming and palm wine tapping. To avoid the over-hunting of the fauna and degradation of the environment, the reserve was later handed over to the Wildlife Department for strict protection. It was gazetted on the 20th September, 1971, under the Wildlife Reserves Regulations of 1971 - LI. 710 under the management authority of Wildlife Department (WD).

1.3 SOCIO-ECONOMIC SETTING

The socio-economic issues in relation to this reserve range from disputes over the rightful ownership of the land, the legality of the boundary demarcation on the southern and south-eastern parts of the reserve to the settler farmers who do not care for the land and not prepared to adopt any strategies that will conserve the productivity of the area. The dispute over the ownership of the land between the Kumawuhene and Kwamanhene complicates the issue of the evacuation of the settlers because the Department does not know which of the chiefs to approach for help. The inhabitants in some indigenous villages on the south-eastern part of the reserve continue to lease the land to settlers for the cultivation of food crops. They only recognise the old boundary enclosing the former Kujani Bush Forest Reserve. The activities of the settler farmers in the reserve have been encouraged unwittingly by the Ministry of Agriculture's practice of running demonstration plots in the reserve on modern agricultural techniques and the Department of Lands insistence on collecting land revenue from the farmers. Efforts to address these issues have been further complicated by politically powerful people who ironically are sympathetic with the activities of the farmers without any attempt to study the issues involved.

MAP 1. KOGYAE S.N.R. IN THE NATIONAL CONTEXT



1.3.1 POPULATION PRESSURE

Most of the settlements around the Kogyae Strict Nature Reserve were established after the opening of the road access to the Afram plains for farming by the PNDC government in 1984. As a result these communities were not counted during the last population census in 1984. The source of the information on the population of the local communities is Rev. Father Roberts of the S.M.A. Catholic Mission. The Mission which is undertaking some development projects at Oku did a census of these communities in 1990-1991. The total population of the communities is 6,893, out of which 1,377 reside in the reserve, (see Map 2). This in one way represents the true picture of the population in the area because many of the present inhabitants are immigrant farmers from the North and Kete Krachi who have moved into the area to take advantage of the fertile arable land. They leave the area once the land becomes infertile and unproductive. Even though there is plenty of land area to contain the population, the fragility of the land and the "alien" farming methods that are being used by the immigrant farmers pose a real threat to the Afram plains in general.

1.3.2 LAND USE

The main land use pattern of the communities in the vicinity of the Kogyae Strict Nature Reserve is the cultivation of food crops. The crops are yam, cassava, plantain, maize and groundnuts. Cocoa is being farmed on a small scale by a few individuals in Sasebosu on the opposite side of the Afram River. There is a forest reserve about 16km on the south-eastern side of the reserve where it is believed a herd of elephants reside.

1.3.3 LAND TENURE AND RIGHTS

Land in the area where the Kogyae Strict Nature Reserve is situated is vested in divisional chiefs, who sublet authority to local chiefs and/or sub chiefs. These hold the land within their jurisdiction in trust for the divisional chief.

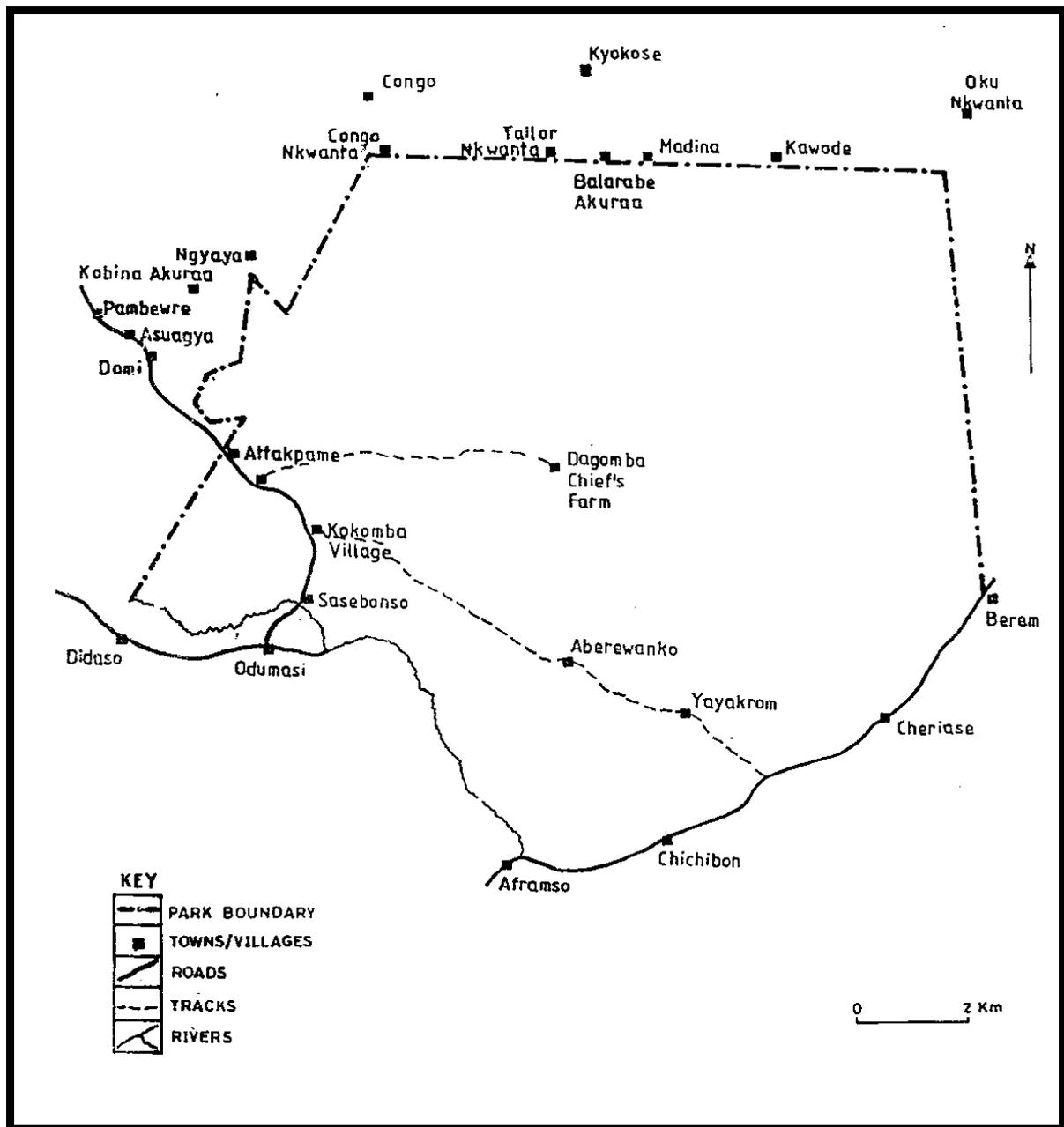
Local inhabitants have the right to use land anywhere provided it is within the jurisdiction of their native or sub chief. Once the land is not being used by another person, the local inhabitants do not need any prior approval from the local/sub chief. However, a settler farmer needs the approval of the local chief to use land for any activity. The land is not sold to the settler and all that is expected of him is to pay a fee of a sheep and drink (schnapps) popularly known as the "ritual fee", for the purification of the land and the stool of the sub chief. Money is usually paid in lieu of the animal and drink. Part of the ritual fee is sent to the divisional chief to inform him about the presence of the settler farmer. Any land that is required for Government projects has to be negotiated with the divisional chief and to whom all compensation for the land is paid.

1.3.4 ADMINISTRATION

The KSNR falls under the Sekyere West District Assembly with the headquarters at Mampong. The District Chief Executive serves as the highest political authority. The area lies within the Nsuta-Kwaman constituency, with an elected member of Parliament.

The traditional ownership KSNR is currently being contested in court by the chiefs of Kumawu and Kwaman. Available records indicate that a court ruling conceded in 1967 that the land is jointly owned by the three chiefs of Kwaman, Kumawu and Agogo who fought as allies and conquered the land from the Chumbulus. However, it was also shown in court that each of the three stools has appropriated a definite areas after the victorious battle and settled thereon and that area became vested exclusively in the appropriating stool. It was also proven that the KSNR and the area close to it, have been for many years in the possession of the Kwaman stool.

MAP 2. COMMUNITIES INSIDE & OUTSIDE KOGYAE SNR



Both chiefs belong to the Golden Stool of Ashanti, the land, therefore, ultimately belongs to the Asantehene. The Kumawuhene has appealed against the court ruling and the case is still pending.

1.4 LOCAL ECONOMY:

1.4.1 LOCAL EMPLOYMENT:

a) CROP FARMING:

The indigenous people used to have cocoa farms in the forest sector of the area which was supported by food crops such as yam, maize plantain and groundnuts. However, the settler farmers grow mainly the food crops already listed above for sale in the big towns. Crops that are planted by women as a source of income included pepper, garden eggs, okra and agushie (neri). The farmers, however, are compelled to sell their farm produce at prices dictated by middlemen because they cannot afford the high transport charges to the market centres. Apart from that they are compelled to sell their produce immediately after harvest because they lack storage facilities.

b) CHARCOAL MAKING:

Charcoal making in and outside the reserve is done mainly by another group of immigrants mostly Sissalas from the Upper West Region. The wood used for the charcoal making is usually obtained from dead trees left behind in the wake of yam cultivation. Yam cultivation requires that all shady trees should be killed by applying intense fire to the base. Fresh trees can also be cut down by the charcoal makers with permission from the relevant chief and the District Forestry Officer. The charcoal is mostly transported in trucks to Kumasi and Accra for sale.

c) LIVESTOCK RAISING

Quite a number of people both indigenous and immigrants resident inside and around the reserve keep sheep, goats and pigs on a small scale to supplement their income in times of great financial need.

d) SALE OF BUSHMEAT

Most of the indigenous villages (i.e. Sasebonsu, Sankasase and Chichibon) started as hunting camps. The inhabitants still continue to hunt in the reserve to sell the meat to commercial meat-mongers from the big cities.

e) LEASING OF TREES FOR TIMBER

This is a prerogative of the chiefs who sell out the timber trees that have reached merchantable sizes to chainsaw operators and/or timber contractors. Notable tree species include Odum, all Red wood spp, Wawa and Senya and Mahogany.

f) OTHER ECONOMIC ACTIVITIES

The distillation of Akpeteshie for sale forms another means of getting income especially by the indigenous people. Palm wine from matured trees is fermented and used as the major raw material.

Wives of the settler farmers pick shea nuts as part of their economic activities. Some women process the nuts into shea butter for domestic consumption and sale or sell the nuts to middlemen who eventually sell them to Cocoa Marketing Board (Coco Bod). Petty trading in items like smoked/dry fish, bread, salt is being engaged by some of the indigenous women, Others operate drinking and catering (chop bars) services.

1.5 INFRASTRUCTURE.

a. ROADS

There are third class roads linking most of the communities to the main roads that lead to marketing centres, However, they are in such a deplorable state that they are motorable only by tractor during the rainy season. Only vehicles with high clearance can travel those roads during other times of the year.

b. WATER SUPPLY

The water situation has improved considerably over the past few years owing to the assistance of World Vision International (WVI). WVI has provided most of the communities with boreholes fitted with hand pumps free of charge. All that the benefiting communities are required to do is to pay deposits of ₦75,000.00 each for the maintenance of the hand pumps. However, some of the communities who could not get the borehole facility still rely on water from streams for drinking and domestic use.

c. Health Facilities

There is a community clinic at Berem manned by two nurses that serve the immediate health needs of the surrounding villages. However, serious cases have to be taken to Ejura, Nsuta or Mampong hospitals where cases requiring surgical operation can be attended to.

The S.M.A. missionaries are putting up a clinic at Oku, which is central to the surrounding communities. This, when properly equipped and manned, will go a long way to improve the health delivery situation to the communities.

d. SCHOOLS

All the schools in those communities that have such facilities are housed in temporary structures mostly roofed with thatch. All the indigenous communities except Sasebonsu and Chichibon have Junior Secondary Schools (J.S.S.). The S.M.A. Catholic Missionaries are in the process of completing a J.S.S. with a workshop at Oku. A kindergarten and primary school will also be added to the J.S.S.

The major problem affecting schools in all the communities is lack of teachers. Most teachers sent there vacate their posts allegedly as a result of the absence of some basic social amenities in the area.

1.6 PEOPLE'S PERCEPTION OF THE RESERVE

The general perception of the KSNR by both the indigenous people and the settlers is unanimous. They see the reserve as potential farm land which should be released to them, especially the savanna section which they claim is very suitable for the production of yam and other food crops. To them it is a waste of arable land to maintain the areas as a reserve. Even though they realize that the land will finish in no time in the light of heavy influx of immigrants to the area, they claim that they will allow longer fallow for abandoned farms to restore their fertility.

In addition, the indigenous people are concerned about the present boundary of the reserve. They recognise only the boundary of the former Kujani Bush Forest Reserve but claim they were not consulted when the extensions were made to the present size of the reserve. Ironically, the present boundary passes through communities like Berem, Chichibon and Cheriase, with the result that some of the inhabitants in these communities live inside the reserve. This state of affairs has led to the present uncontrolled use of the reserve land for farming, timber logging, charcoal making and akpeteshie distilling.

The indigenous people concede that the reserve exerts enormous influence on the environment in general and rainfall in particular. It also protects wild animals which otherwise would have been non-existent in the area, to the disadvantage of future generations. As a compromise measure, the Indigenous people have requested for an exclusion boundary that demarcates some of the reserve's land for their farming activities. They are willing to help in the new boundary demarcation as well as check any abuse of the rest of the reserve thereafter. All the settler farmers will then be withdrawn from the reserve and offered land elsewhere to settle.

1.7 AREAS OF CONFLICT

a. Boundary Line:

When WD took over the administration of the Kujani Bush Forest Reserve from Forestry Department there were a series of extensions to the boundary to form the present Strict Nature Reserve. These extensions make use of the Ejura-Oku road in the north and the Oku-Aframso road in the south-east as part of the reserve boundary. This boundary passes through three of the indigenous communities, thus creating a situation where some of the local people do not recognise this new boundary. In addition to the fact that the boundary line shifts every time the roads change, critical examination indicated that the road-boundary does not correspond exactly to the LI description. All these have led to a lot of agitation and disrespect for the reserve boundary, resulting in indiscriminate lease of land for farming, timber logging and charcoal making.

b. Illegal Settlement:

At the time of gazetting of the KSNR in 1971, there were some settler communities already located within the reserve. These have not been resettled outside the reserve up to now. This apparent attitude of negligence by WD has led to the springing up of other numerous settlements in the reserve. These people who are immigrants, mostly from the North, have expanded both in population and space.

c. Farming

The main occupation of the immigrants settling within the KSNR and in Berem is farming. The most common crop cultivated is yam which requires that all shade trees must be killed. This type of farming is alien to the areas and, therefore, creates a lot of environmental degradation. The head of one of these communities (Dagomba Community) was judged the best Ashanti Regional Yam farmer in 1991. Since then he has farmed so extensively that the original Kujani Forest is seriously threatened.

d. Poaching:

Poaching was found to occur throughout the reserve. This was evidenced by the numerous hunting camps, spent cartridges, carbide, gin traps and wire snares that were observed. Hunting on commercial basis is generally done by the indigenous people even though the settlers trap small animals for domestic consumption. Group hunting using dogs is also carried out in and around the reserve in the dry season with the resultant escalation of bushfires. Equipment usually used during such hunting expeditions include clubs, cutlasses and rarely guns; and there have been several occasions when staff have been assaulted and beaten up for trying to arrest poachers.

e. Tree Cutting:

Commercial charcoal making is taking place throughout the reserve where farming is taking place. Dead trees that have been left over after farming are usually used, even though live trees are occasionally cut for the purpose. Poaching of timber trees by logging companies and individuals occurs in the southern part of the reserve.

f. Bushfires:

The incidence of annual bushfires is one of the practices threatening the ecological stability of the reserve. The combined activities of the farmers, hunters and charcoal makers bring about these fires every dry season.

g. Distillation of Akpeteshie:

The establishment of camps to distil akpeteshie is usually associated with large scale felling of palm trees. The palm wine is fermented and distilled into the local gin (akpeteshie).

SECTION TWO

2.0 RESERVE STATUS AND GENERAL DESCRIPTION:

2.1 BIOPHYSICAL SETTING:

2.1.1. Geology and Soil:

The geology of the KSNR belongs to the Voltarian system and the rocks appear as a reddish-brown sandstone whenever exposed. Outcrops of flat-bedded red sandstone are common between Siribudang and Akuma. The soil in the savanna areas are fragile, soft under the foot and liable to alternate flooding and drying as a result of the flat-bedded sandstone rocks near the surface. The soils of the forest are loamy and liable to dry out quickly because of free drainage caused by the presence of a 2.5cm to 5.0cm layer of humus.

2.1.2. Drainage:

The KSNR is about 120 metres above sea level, rising to about 215 meters across the mid-portion from west to east. The hilly regions on the south to the south-western corner of the reserve are notably high, rising to a height of about 230 meters.

The reserve is well drained by a host of rivers. The rivers in the north, mainly Dantibon Ajabura and Akuma, flow northwards into the Sene river. Streams like Sibon, Takruasi, Obuasi, Chichibon and Adencheche flow southwards into the Afram river (see Map 3). All the streams in the reserve dry up during the dry season, leaving the Afram river as the main source of water for the wild animals in the reserve.

2.1.3. Climate:

The nearest meteorological station is at Ejura, 25km north-west of the reserve. The data obtained from the station indicate a mean annual rainfall for the years 1961 to 1990 to be 1364 mm. The area enjoys a double rainfall season between May and October with the peaks occurring in June and September.

2.2. FLORA:

105 species of vascular plants have been identified in Kogyae Strict Nature Reserve. They are made up of 57 trees, 10 shrubs, 9 climbers, 17 herbs and 12 grasses.

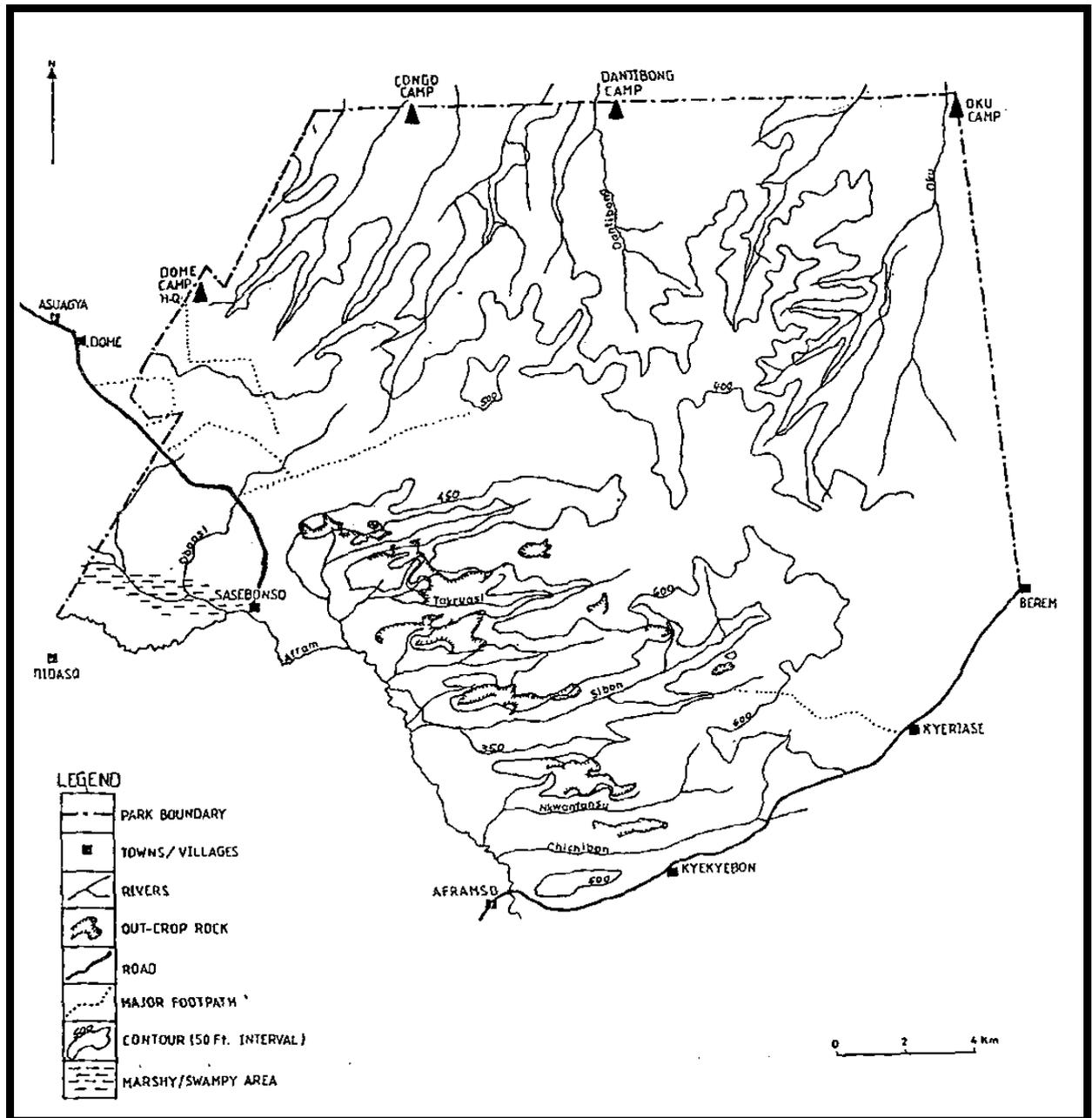
2.3. VEGETATION:

The vegetation of KSNR, which is transitional between high close forest and open tree savanna, has been described variously as Guinea Savanna (Taylor, 1952) and Derived Savanna (Rose Innes, 1977). A detailed report of the vegetation of KSNR is given by Schmitt and Adu-Nsiah (1993). They distinguished four main plant communities in the reserve (Map 4).

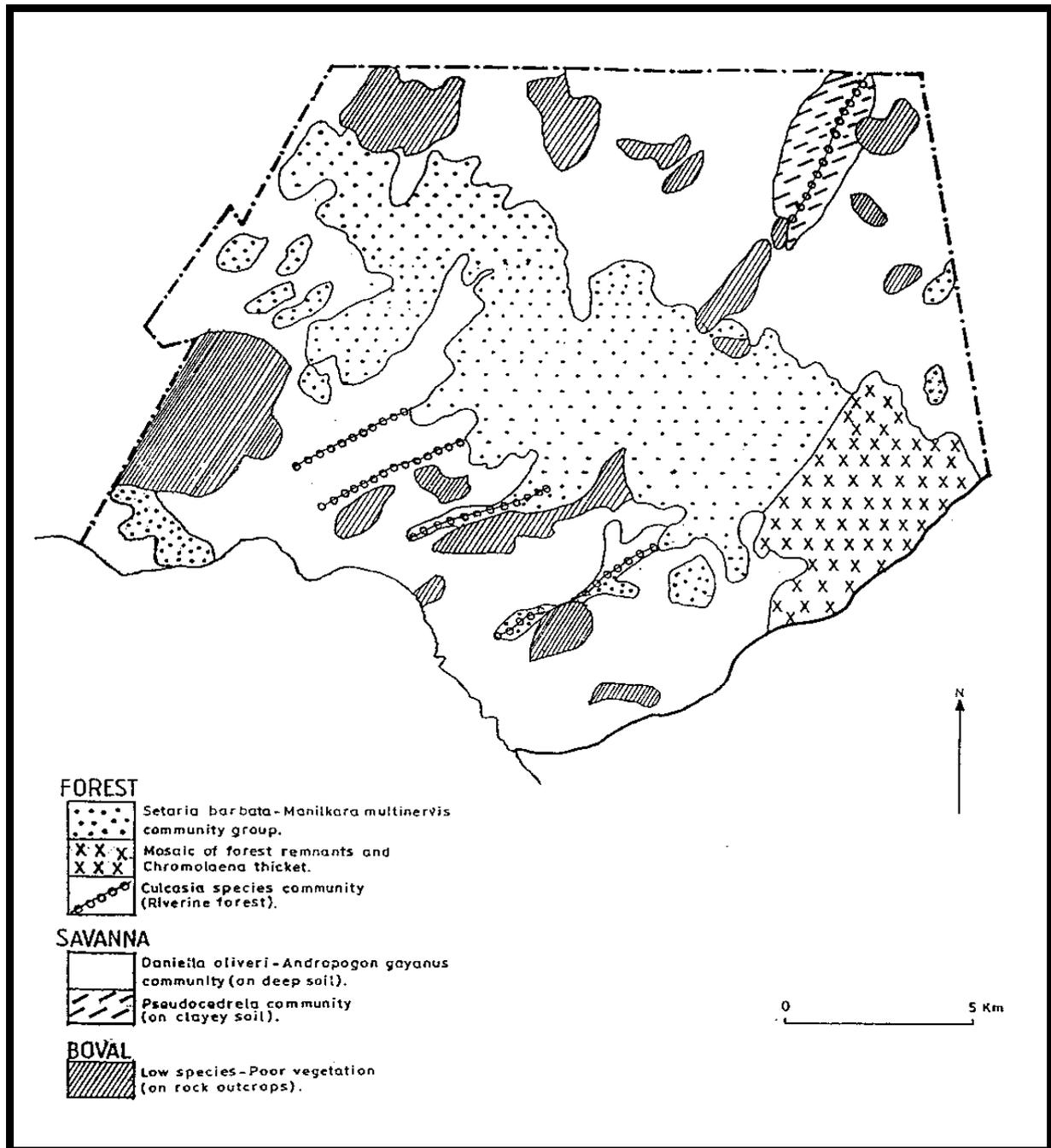
2.3.1. Transitional Forest:

This vegetation type is found between the true forest zone and the Guinea Savanna woodland. There are two sub-communities found within the transitional forest.

MAP 3. RELIEF & DRAINAGE MAP OF KOGYAE SNR



MAP 4. VEGETATION MAP OF KOGYAE SNR



a. The transitional forest towards the true forest zone (remnant *Antiaris-Chlorophora* forest). This type of vegetation is found at the south-eastern part of the reserve, near Berem and Cheriase. Its present status is a degraded forest as a result of the nationwide bushfire in 1983, subsequent annual bushfires, intensive maize farming and selective exploitation of timber species like Odum (*Chlorophora excelsa*) and Kyenkyen (*Antiaris toxicaria*). Other remnant forest trees include *Triplochiton scleroxylon*, *Cola gigantea*, *Azelia africana* and *Albizia adianthifolia*.

b. Transitional forest towards the Guinea Savanna woodland. Most of the trees found here are similar to those of the Guinea Savanna. About one third of the reserve area is made up of such forest. The dense tree cover (12-20m) has two stories. Characteristic trees of the upper storey are *Minilkara multinervis*, *Anogeissus leiocarpus*, *Ceiba pentandra*, *Khaya senegalensis*, *Antiaris toxicaria*, *Chlorophora/Milicia excelsa* and *Nesogordonia papaverifera*. Trees of the lower storey consist of the poisonous *Erythrophleum suaveolens*, *Cola gigantea*, *Cola chlamydantha* and *Diospyros mespiliformis*. *Panicum maximum* and *Chromolaena odorata* have invaded these areas because of the annual bush burning.

2.3.2 Riparian Woodland:

This is made of narrow bands of dense woodland along the seasonal streams that flow into the Afram and Sene rivers. The tree cover, which is about 50% and grows up to 12m high, has *Ceiba pentandra*, *Manilkara multinervis*, *Lonchocarpus sericeus* and *Lannea kerstingii* as the dominant species. *Daniellia ogea*, *Cleistopholis patens* and *Nauclea diderichii* are found along the Afram river, which forms the south-western boundary of the reserve.

2.3.3 Typical Savanna:

This is the Guinea Savanna that surrounds the transitional and riparian forests in the reserve. It is composed of tall tussocky grasses of the genera *Andropogon*; *Hyparrhenia* and *Cymbopogon*. The trees are medium to short in structure, usually corky barks, widely spaced and, therefore, not forming a closed canopy. Characteristic trees are *Daniellia oliveri*, *Terminalia avicennioides*, *Lannea kerstingii*, *Pterocarpus erinaceus*, *Pseudocedrela kotschy* (on wetter sites), *Vitellaria paradoxa* and *Lophira lanceolata*.

2.3.4 Boval Vegetation:

This vegetation occurs at the south-western section of the reserve where there are rock outcrops of sandstone and lateritic ironpans. The average height of grasses and herbs in this community is 70cm to 2m high, with an average plant cover of about 50%. The soil is generally shallow.

The characteristic vegetation of the boval is made up of herbs, sedges and grasses of the *Andropogon* genera in moist soils between rocks. The herbs layer is made up of *Asphillis linearifolia*, *Talinum zeylanicum*, *T. triangulare*, *Cyanotis arachnoidea*, *Crinum zeylanicum*, *Fimbristylis ovata*, and *F. scabrada*. *Andropogon tectorum* and *A. schrinis* are the grasses that occur there.

2.4 FAUNA:

From the zoological point of view four habitat types can be recognised within KSNR.

2.4.1. Farmlands:

These are found throughout the reserve except in the northern section. They include land that is presently under cultivation and that which has recently been abandoned. Such farms often provide ready source of food for the animals.

Animal species found during the survey to frequent these areas are ground squirrel (*Xerus erythropus*), grasscutter (*Thryonomys swinderianus*), bushbuck (*Tragelaphus scriptus*), red-flanked duiker (*Cephalophus rufilatus*) and grey duiker (*Sylvicapra grimmia*). The abandoned farmlands, particularly where *Chromolaena odorata* (Acheampong weed) is the major plant species, provide shelter for the animals.

2.4.2. Savanna:

Two types of savanna can be distinguished. The grassland and woodland savanna, found in the northern and north-eastern parts of the reserve respectively, are associated with scattered trees and varying canopies between 20-70%.

Animal species discovered to frequent these areas were bush buck, red-flanked duiker, patas monkey (*Erythrocebus patas*) and grasscutter. Waterbuck (*Kobus ellipsiprymnus defassa*), kob (*Kobus kob*), buffalo (*Syncerus caffer*) and baboon (*Papio anubis*) were less frequently observed to occur here.

2.4.3 Forest:

The forests in the KSNR are found along rivers and streams and the natural forest of the original Kujani Forest Reserve. The canopy cover ranges from 50% to over 80%. The animal species that were found to occur in these areas were red river hog (*Potamochoerus porcus*), spot-nosed monkey (*Cercopithecus petaurista*) and black and white colobus (*Colobus polykomos*).

2.4.4. Bare Rock Areas:

These areas are restricted to the southern and south-western end of the reserve where rock outcrops form a ridge. Activities of bushbuck and oribi: (*Ourebia ourebi*) were mostly frequently observed.

2.4.5. Habitat Assessment and Utilization:

The KSNR is known to be made up of two patches of forest sandwiched by Guinea Savanna. However, after the nationwide bushfires of 1983, the constitution of the vegetation underwent a drastic change. The sizes of the two patches of forest were reduced, with the result that the savanna surrounding the forest makes it more susceptible to annual bushfires. This has led to the consistent and gradual loss of the remaining forest of the Kogyae Strict Nature Reserve.

The above events have the resultant effect of reduction in the wildlife populations and complete loss of some animals like the bay and yellow-backed duikers. This situation could be due to the fact that many of the animals were killed in the 1983 bushfires and subsequent annual fires. The bigger animals also became more susceptible to poaching.

Farming in Kogyae Strict Nature Reserve has been the most devastating activity to the wildlife resource. Large portions of the original Kujani forest have been cleared resulting in the invasion of *Chromolaena odorata* and other savanna species especially in the southern

and south-eastern parts of the reserve. The destruction of the animal habitats has probably led to the drying up of streams in the reserve and the disappearance of some animal species. Animals like the buffalo, whose ranges are determined by the availability of water, have to migrate in search of water to the Afram and Sasebon rivers. Notwithstanding, the remains of the Kujani forest together with the riverine forest still harbour the last vestiges of the forest fauna including the black and white colobus, spot-nosed monkey and red river hog. The grasscutter, bushbuck and red-flanked duiker seem to thrive well in the face of sustained human impact and fire. They were found to occur throughout the reserve under every condition. Buffalos and waterbucks were found to be concentrated in both the forest and savanna areas in the river and stream beds. The guinea savanna at the northern portion of the reserve supports most of the savanna species. These species include the olive baboon, patas monkey, grey duiker, and kob. The presence of an aardvark was also recorded in the northern sector of the reserve.

2.4.5 Species of Special Interest

a. Duikers

All the duikers, except the yellow-backed and bay duikers, that were recorded in 1990 were found to still occur in KSNR. Maxwell's duiker seems to be trailing behind the bay and yellow-backed duikers in the extinction line as far as KSNR is concerned. Hunting pressure is probably the cause of the decline in their populations, since there are excellent habitats for the Maxwell's duiker. Effective protection of the ecosystem and strict law enforcement are the only means by which a population build-up of duikers can occur.

b. Roan Antelope and Hartebeest

According to some field staff, these species have not been observed in the reserve for more than 10 years. The combined effects of the nationwide bushfires of 1983, intensive poaching pressure and the influx of settler farmers into the reserve have been said to be responsible for their absence. They have either been shot out or have migrated to safer pastures. These could be reintroduced after the evacuation of the farmers and with adequate protection; they will thrive well in the savanna habitats.

c. Other Artiodactyls:

The bushbuck was one species that was found to be persistent both in the savanna and forest habitats of the KSNR. This animal has a tremendous potential in exploding in numbers in the reserve. Adequate protection would lead to a build up in its population as well as that of the buffalo and the kob. With improvement of the water situation throughout the reserve, the populations of waterbuck and red river hog would also increase.

SECTION THREE

3.0 CURRENT MANAGEMENT STATUS

This section of the management plan highlights the management status and activities or strategies that are currently pursued in the KSNR.

3.1 MANAGEMENT GUIDELINES:

The management of KSNR, like all protected areas in Ghana, has suffered from lack of definitive policy or management guidelines since it was established in 1971. There has been no consistency between the strategies of the different Senior Wildlife Officers that have been posted there over the years. It has, therefore, been run on an *ad-hoc* basis with the result that the particular officer in-charge is at liberty to determine his own priorities. Even though it is the only gazetted Strict Nature Reserve it has been managed like any of the other reserve categories in the country. No research or monitoring has ever taken place in the reserve.

3.2 INFRASTRUCTURE

The headquarters of the reserve are situated in Dome camp. There is an office building for the Senior Wildlife Officer and his typist plus a store. The Senior Wildlife Officer lives in Ejura, about 25km from Dome Camp, for alleged administrative reasons, even though it is believed by the planning team that he would be more effective if accommodation is provided for him at Dome camp. There are six manned camps, with the staff at Berem and Afranso camps living in hired accommodation in the two respective villages (see Map 5). The staff at those two camps were observed to be so ineffective in the performance of their duties for fear of molestation by the villagers that the team recommended their withdrawal to the base camp to constitute a mobile striking force. A block of six rooms was constructed in May 1993 for staff accommodation at Dome camp but the other camp staff at Congo, Dantibon and Oku stay in dilapidated buildings.

Roads:- The reserve can be reached from either Ejura on the north-western side or from Mampong on the south by third class roads which are motorable in the wet season only by tractor or 4-wheel drive vehicles. Part of this road forms the external boundary on the eastern and the northern side of the reserve. Within the reserve, the farming settlements can be reached by tracks that are difficult to use except by tractor and cargo trucks. The road from Dagomba Akura village to Chichibon through Abrewanke has been abandoned for many years.

Vehicles -Transport facilities of the reserve consist of the following;

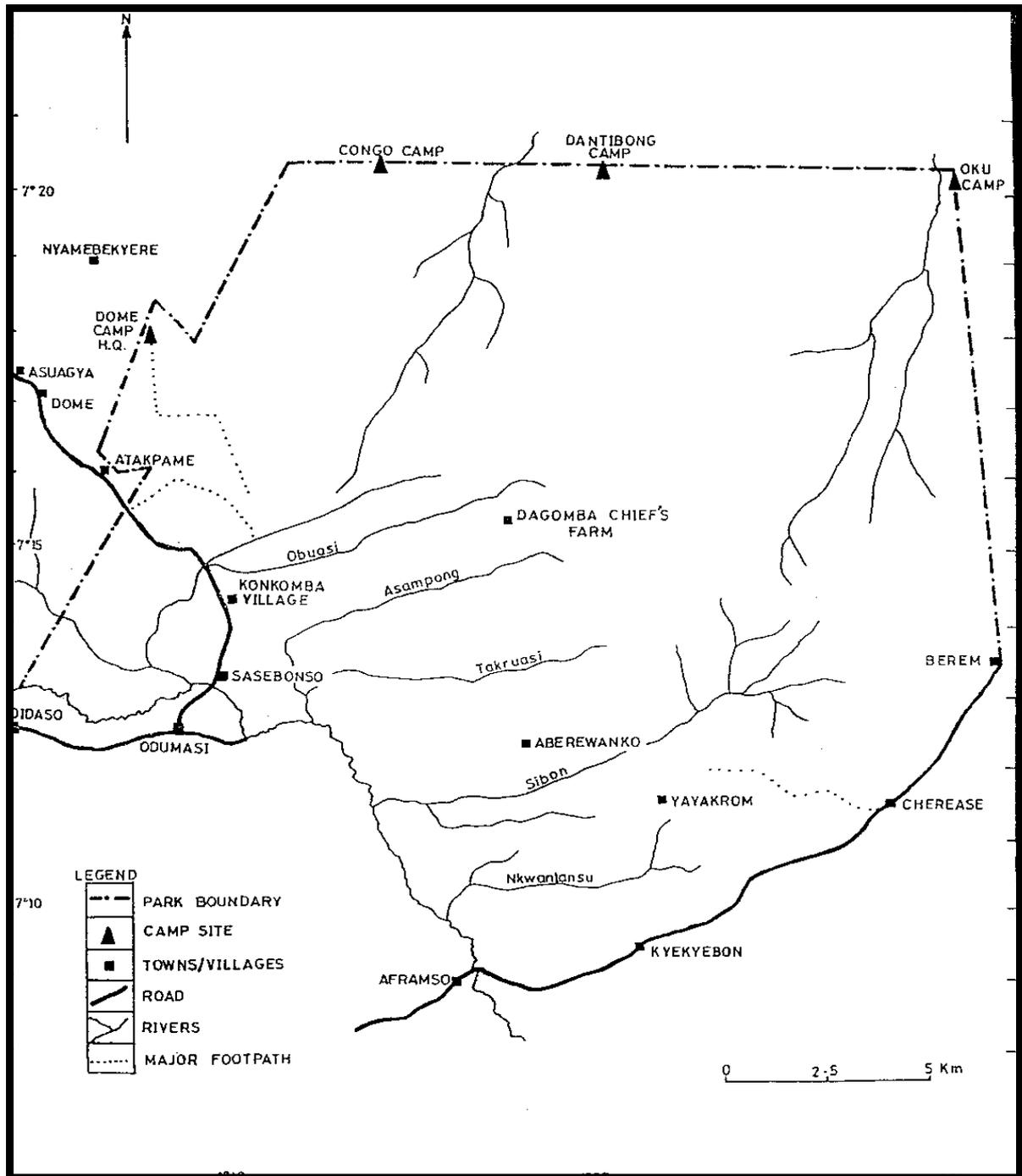
<u>Vehicle</u>	<u>Condition</u>
Mitsubishi Pickup	Serviceable
Land Rover	Repaired by Mr Mason for his use
Motorbike	Unserviceable

Two motorbikes were sold to the officer in charge and the Wildlife Ranger under the FRMP.

3.3 ADMINISTRATIVE STAFF

Presently, there are 28 staff stationed in KSNR. They are made up of 1 Wildlife Protection Officer, 1 Wildlife Ranger, 4 Technical Assistants, 3 Camp Supervisors, 16 Skilled Labourers, 1 Typist, 1 Night watchman and 1 driver. There is also one Junior Accounts Officer, seconded from Accountant General's Department to be in charge of accounting.

MAP 5. CAMP DISPOSITION OF KOGYAE STRICT N.R



Twenty four of the total number are posted to protective camps for law enforcement purposes within the reserve. Due to the fact that the headquarters of the reserve is at the base camp, the typist and night-watchman also stay at the camp even though they do not perform protection duties. The 24 protection staff give the reserve a theoretical coverage of 1 ranger per 16 km² as compared to the national one of 1 ranger per 33 km². Taking into consideration the hostile attitude of the local people and the fact that a research section will be set up here, the 24 staff are inadequate for effective law enforcement, monitoring and conservation education.

3.4 EXPENDITURE RATIOS

Money for recurrent expenditure is one of the major factors that determines the success of any conservation programme. The recurrent expenditure should not be less than 70% of the total budgetary allocation (Clarke and Bell, 1984). However, an analysis of the expenditure ratios of KSNR for the period 1988 to 1993 indicates that an average of 89.8% was on payment of staff salaries. This is a reflection of the general government economic policy which unfortunately has given rise to the inefficient running of the reserve in all spheres.

Table 1: Budget

Year	Salaries	Others	% Salaries	% Others
1988	1,661,000	220,000	88.3	11.7
1989	4,520,000	291,500	93.9	6.1
1990	5,706,000	813,500	88.0	12.0
1991	9,294,500	1,059,000	90.0	10.0
1992	9,203,000	796,000	92.0	8.0
1993	4,177,746	645,000	86.6	13.4

3.5 REVENUE GENERATION:

Revenue is generated by Kogyae Strict Nature Reserve from the issue of Game Licence and the sale of confiscated bushmeat and trophies. In 1993, revenue was obtained from only the issue of hunting permits and sale of confiscated meat, which amounted to ø156,000. This represented 3% of the total government subvention to the reserve.

Table 2 Locally Generated Revenue

Year	Game Licence	Sale of Bushmeat / Trophy	Total
1988	40,600	21,050	61,650
1989	95,000	47,150	142,150
1990	131,700	-	131,700
1991	39,000	1,800	40,800
1992	12,000	12,000	24,000
1993	27,000	129,000	156,000

3.6 VISITORS

As a Strict Nature Reserve, no visitors/tourist are permitted into the KSNR by Department policy. Researchers who would have been permitted have not come to the reserve since its creation. This is probably due to the fact that universities in the country are not aware about the management objectives of the reserve.

3.7 MANAGEMENT ACTIONS

a. Antipoaching Patrols:

Most anti-poaching patrols are done during the day even though limited night patrols are conducted. The normal patrol team is made up of 3 to 4 staff with one person staying back at camp. There is an anti-poaching team based in Dome Camp who conduct patrols throughout the reserve. The team appears to be more effective in law enforcement than the camp staff.

Patrol equipment is very limited. There are only 4 firearms available to the staff to face the hostility of the indigenous inhabitants and other poachers. These guns are normally monopolised by the anti-poaching team leaving the other camp staff to use cutlasses during patrols.

b. Cleaning of the Boundary

A greater part of the boundary of KSNR is defined by various features i.e. Ejura-Oku-Aframso road and the Afram river. The part of the boundary that is cleaned by the staff is from the Dome camp to the confluence of the Afram and Dida Rivers. However, part of that boundary has not been cleaned for such a long time that the staff do not know its location any more.

c. Establishment of Strip Plantation

Planting has only been done from the Dome Camp to Atakwame. The rest of the boundary to be planted with strip is unrecognisable. A bit of the strip has also been planted along the Dome-Oku and Oku-Berem roads. So far about 8km of strip has been planted. Teak (*Tectona grandis*) has been used for the strip.

d. Maintenance Schedules

No regular maintenance programme for camp building or other programme exists. This is largely as a result of insufficient monetary allocation for the reserve. As a result, the camp buildings, except the new structure at the base camp, are hardly fit for human habitation.

3.8 CHIEF MANAGEMENT CONSTRAINTS

- a. Even though there are broad objectives for the establishment of the KSNR, the reserve has suffered from mismanagement and lack of direction because of the absence of definite policy guidelines outlined in a management plan.
- b. The present boundary along the road from Dome to Oku and Aframso does not exactly conform with the boundary description in LI. 710. The other implication is that anytime the road changes, the boundary line will also change since there are no pillars demarcating that part of the boundary. The land at the south-western corner of the reserve is believed to be under the jurisdiction of Beposohene. The staff have continually been prevented from cleaning the boundary of that section of the reserve by the inhabitants of Didaso because they claim their chief has not released the land to the Department.
- c. Ineffective law enforcement due to the hostility of the indigenous communities and the persistent refusal to recognise the extensions made by the Department to the Kujani Forest Reserve to form the new boundary.
- d. lack of camp accommodation for staff at Berem and Aframso. The staff living in the hired accommodation are prevented from performing their duties by the local people.
- e. lack of conservation education programmes for the local people.
- f. Illegal farming; stranger settlers have turned the KSNR into farmland. The activities of the inhabitants of Dagomba Akura pose great threat to the Kujani forest. Their farming practices require that all shady trees should be killed.

SECTION FOUR

4.0 MANAGEMENT AND DEVELOPMENT PROPOSALS

This part of the management plan forms the functional section of the planning document as it outlines specific proposals for the development of KSNR. The section sets out specific objectives and the necessary prescriptions needed to accomplish these objectives.

4.1 GENERAL MANAGEMENT OBJECTIVES

The general management objectives for SNR as outlined in the Ghana Wildlife Policy are as following:

1. To protect nature and maintain the natural process in an undisturbed state of representative samples of the natural environmental evolution.
2. To allow natural processes to alter the system in a dynamic way i.e. to allow fire, succession, disease etc to run their course on condition that such influences are not man induced.
3. To exclude development, hunting, fishing, forestry, agriculture, prospecting, construction, of extraction of biological or mineral resources and the introduction of any species exotic or otherwise.

Strict Nature Reserves are generally small areas containing fragile habitats that should be afforded the highest protection possible. These areas are reserved for scientific research, monitoring and the conservation of unique ecosystems. It is apparent that the KSNR has not succeeded in this direction as a large part of the reserve has been used for farming, logging and making of charcoal. Proposals will be put forward that will zone those parts that are still relatively undisturbed by human influence for monitoring and research. The rest of the reserve that has been degraded will be managed for the restoration of the wildlife resources to their original state. Proposals will also be made to solve the issue of the boundary line with the indigenous inhabitants.

4.2 SPECIFIC MANAGEMENT OBJECTIVES

In accordance with the Wildlife Policy of Ghana and considering the results of the biological inventories and socio-economic survey, KSNR will be managed according to the following specific objectives.

1. **To ensure the maintenance of the undisturbed section of the reserve in its natural state for ecological processes to continue without any human influence by**
 - a. maintaining the present boundary as described in LI 710 of 5th November 1971 and erecting pillars to mark the extent of the reserve.
 - b. marking out a zone of influence for the inhabitants of Berem, Cheriase, Chichibon and Sesebonsu to ensure that all their farming and other activities are confined within these areas.
 - c. instituting measures to eliminate all forms of destructive farming to protect the tree cover in the zone of influence, eg yam farming.
2. **To allow the regeneration of the vegetation in the degraded sections of the reserve and restoration of wildlife populations by**

- a. evacuating all settler farmers from the reserve and ensuring that those farmers staying outside are prevented from farming within the reserve.
 - b. intensifying the law enforcement methods against timber contractors, charcoal makers, akpeteshie distillers and poachers in general.
 - c. provision of permanent water supply in the degraded Guinea Savanna for the animals.
 - d. reintroduction of roan antelope and hartebeest into the reserve.
- 3. To improve the morale, welfare and capabilities of the field staff by**
- a. providing decent accommodation at all the camps
 - b. providing adequate equipment for law enforcement
 - c. ensuring regular supervision by the Senior Wildlife Officer who lives in Ejura. Visits should not be limited to payouts alone.
 - d. providing welfare services to camp staff; eg first aid boxes for every camp, distribution of WFP food at camp level and on time.
- 4. To initiate research and monitoring programmes by**
- a. opening a mini research station at the reserve headquarters.
 - b. encouraging the universities and other researchers to undertake research programmes in the reserve
- 5. To integrate the development of the reserve with that of Afram Plains by**
- a. incorporating the reserve development within the overall development plan of the Afram Plains
 - b. liaising with NGOs like WVI and S.M.A., who are undertaking development projects in the Afram Plains.
 - c. introducing modern food storage technology for the local inhabitants to preserve their farm produce
- 6. Taking advantage of the fact that KSNR is the only conservation area in the Afram Plains, to use it as a venue for conservation education by**
- a. giving conducted tours to wildlife clubs, schools and other organised groups. This should be confined to the restoration zone.
 - b. mounting an exhibition centre at the base camp for public education.

4.3 BOUNDARIES OF RESERVE

The present boundaries of KSNR were described in the Wildlife Regulations LI 710 of 5th November, 1971. It was discovered during the survey that the Dome-Oku-Berem-Aframso road does not exactly conform with the LI description.

The present boundary description will be maintained but it should be unambiguously pillared to avoid changes in the roads affecting them. No portion of the reserve should be de-gazetted.

4.4 ZONATION

Zoning of a protected area is a basic management practice which divides the assets to provide proper recognition and protection for the resources of the area. This enables the reserve's personnel to determine the appropriate management regime and development

programmes for the different zones. Based on the results of the inventories carried out on the bio-physical resources of the reserve, four management zones are recognised, (see Map 6). It should be emphasised that these zones are being created with the understanding that WD will liaise with the traditional authorities of Kumawu and Kwaman to get the settler farmers removed from the reserve by 1996.

4.4.1 PROTECTED/STRICT NATURE ZONE

Description:

These are the areas of the reserve which represent the most important and least disturbed habitats and stand the chance of being degraded by the farming activities of the settler farmers. These should be preserved and nothing by way of human activity should be permitted within this zone that is likely to degrade their natural values or interfere with the natural processes taking place there. These areas also have the greatest concentration of animals in the reserve.

The original Kujani Bush Forest is already being threatened by the farming activities of the Dagomba community living in the reserve and the Grunshies staying in Berem. Large tracks of forest trees are killed in the process and if these relatively undisturbed portions of the reserve are not protected, there will be nothing left of the reserve by the end of two years.

Extent:

The areas recommended for maximum protection are the original Kujani Bush Forest Reserve and the Guinea Savanna on the northern and eastern sections of the reserve. Together these areas make up 220 km² representing 57% of the reserve's total area.

Management Aims and Prescriptions

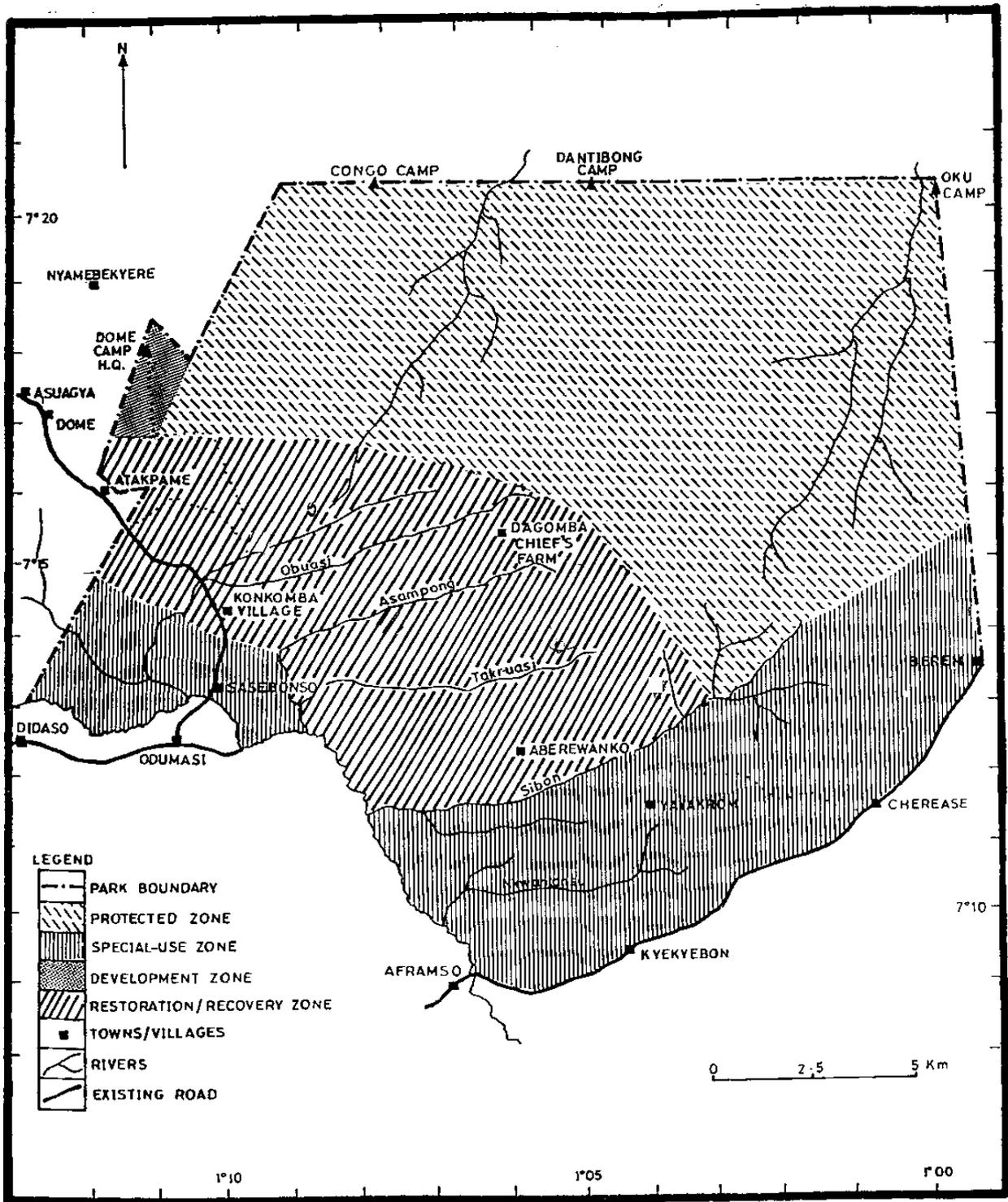
Aims:

1. To preserve these characteristic transitional vegetational and associated faunal types for scientific monitoring and as a source of genetic material.
2. To maintain the tree cover in order to protect the watersheds of the tributaries of the Sene and Afram rivers.
3. To preserve the forest as historic grounds for the Kumawku, Kwaman and Agogo people, as a place where one of their victorious battles against the Chumbulus was fought.
4. To provide protection of the zone from the destructive annual bushfires.

Prescriptions:

1. Prevention of all forms of farming, timber extraction, poaching and charcoal making within the zone by intensification of the patrols.
2. Construction of a firebreak along the southern boundary of the original Kujani Bush Forest Reserve to protect the zone.
3. Liaising with the local people to locate any site of cultural/historic importance for special protection and restriction.

MAP 6. MANAGEMENT ZONES OF KOGYAE SNR



4.4.2. ZONE OF INFLUENCE/EXCLUSION ZONE:

Description:

This zone supports land-use practices that are normally not compatible with conservation activities but have been forced on management as a compromise with the local communities to resolve certain conflicts as a result of the boundary extension.

These are areas demarcated out of the reserve for the indigenous inhabitants of Berem, Cheriase, Chichibon and Sasebonsu to enable them engage in their farming activities. Within this zone, there will be no hunting and the type of farming permitted here will not require the killing of all shady trees. Since the area is not de-gazetted, WD still has control over the activities inside it. Any settler farmer admitted by the indigenous people will have to abide by the regulations within the zone.

Extent:

The Zone of Influence consists of a 16 km² area on the south-western corner of the reserve to the confluence of the Afram and Dida Rivers, plus an area of 79 km² to the south-eastern portion of KSNR using the Sibon River as the boundary and hitting the Oku-Berem road 3.5km from Berem. The total exclusion zone represents 20% of the reserve area. It is recommended that natural features should be used to demarcate this zone where they are available.

Aims and Prescriptions:

Aims:

1. To ease the tension/conflict that presently exists between the WD and the inhabitants of the various indigenous communities over farm land.
2. To make the inhabitants cooperate with the staff for the conservation of the resources in the reserve.
3. Not to allow any settlement within this zone by squatters.

Prescription

- a. With the participation of the local communities, demarcate an area of 95 km² for the farming activities of the inhabitants of Berem, Cheriase, Chichibon, and Sasebonsu.
- b. Introduction of modern agricultural practices that are sympathetic to the environment
- c. Eject any farmer who refuses to conform with laid down regulations for the use of the land. These regulations should be drawn by a board made up of WD, representatives of the communities, the traditional councils of Kumamwu and Kwaman, and the District Assembly.
- d. Prevent timber extraction by contractors and chainsaw operators.

4.4.3. RESTORATION ZONE

Description:

The areas to be designated as Restoration Zone are those lands that have been degraded or significantly altered by farming, logging and charcoal making. The areas have been leased to immigrants for settlements and farming. Large numbers of timber species have also been felled by timber contractors and chainsaw operators with the resultant creation of numerous haulage tracks to retrieve the felled timber. The environment has been so degraded because yam farming requires that all shady trees on the farm be killed. These dead trees are later used for charcoal making. The management priorities in this zone will be to exclude all forms of destructive activities and provide facilities for the recovery of the vegetation and wild animal populations in the reserve.

Extent:

The restoration zone consists of the rest of the extension to the southern boundary of the Kujani Bush Forest Reserve. This area constitutes about 86 km², representing 22.3% of the reserve.

Aims and Prescriptions**Aims:**

1. To provide conditions for the regeneration of the degraded vegetation and the provision of optimum conditions necessary for the build up of animal populations
2. To provide facilities and equipment for efficient law enforcement.
3. To act as a buffer to the Protected Zone.

Prescriptions:

- a. Evacuate the settler farmers by liaising with the regional Minister, the District Chief Executive and the traditional authorities of Kumawu and Kwaman.
- b. Construct two dams to provide water to the animals during the dry season when all the streams dry up.
- c. Increase the efficiency of law enforcement by opening a camp at Dagomba Akura after they have been evacuated to control the activities of the inhabitants of Sasebonsu and providing permanent camp buildings for staff at Berem and Aframso.
- d. Re-open the road from Dome to Sasebonsu and Chichibon to facilitate access by the anti-poaching team and other staff during law enforcement.
- e. Provide adequate firearms and other patrolling equipment to field staff as the firearms in particular will deter any hostile attitude to GWD staff during the performance of their duties.

4.4.4 DEVELOPMENT ZONE:**Description:**

This part of the reserve has been set aside for staff accommodation, administration facilities (headquarters), the mini research station, and a centre for conservation education. A significant amount of development will be allowed within this zone.

Extent:

This zone is made up of 1 km² encompassing Dome camp. This represents less than 1% of the total land area of the reserve.

Aims and Prescriptions:**Aims:**

1. To restrict all major infrastructural development within this zone.
2. Provide a means for monitoring the natural processes in the reserve.
3. Provide a venue for conservation education.

Prescriptions:

- a. Construct a mini centre for research and monitoring.
- b. Construct additional houses to accommodate the research officer and his/her team.
- c. Construct a visitor centre for conservation education.

SECTION FIVE

5.0 INTEGRATED MANAGEMENT FOR KSNR & COMMUNITIES:

The KSNR is a relatively small unit of the vast Afram Plains presently under siege by settler farmers mostly from the northern part of the country. This state of influx has been brought about as a result of the opening of accessibility to the area in 1984 by the then PNDC government in an effort to increase food production in the country.

The development of KSNR cannot, therefore, be treated in isolation, but should be treated as an integral part of the land use planning for the whole Afram Plains. Thus the management of the reserve must be co-ordinated with the management of the surrounding lands. Even though the proposals that are being put forward here will not be implemented immediately, however, they should be integrated with the programmes of some NGOs operating in the district. This will go a long way to safeguard the sustainable development of the reserve. WVI have provided potable water to many of the communities within the vicinity of the reserve. All that the communities are required to do is to deposit an amount of ₵75,000. per community for the maintenance of the hand pumps.

The organisation could be contacted to include the observance of wildlife regulations as a precondition for the provision of a borehole. Since the communities are not paying anything for the cost of these hand pumps, it will be made clear to them that any community that violates these regulations will have the pumps dismantled. The S.M.A. Missionaries are also putting up a clinic and a school from kindergarten to J.S.S. These facilities will go a long way to improve the living conditions of the people.

It is anticipated that with the improvement of the socio-economic situation of the place, more immigrants will be encouraged to move into the area with the resultant increased pressure on the resources. The inhabitants have to be made aware that the wise use of the reserve is linked to the development of the area.

One of the problems that prevents the people to enjoy the fruits of their farm labour is post harvest losses. Because of this the "middlemen" offer low prices for their farm produce. The Extension Services Division of the Ministry of Food and Agriculture will be contacted to acquaint these people with storage technology. In this way they will be able to keep their food stuffs until such time that they will get higher prices or be able to dictate the price levels of the farm produce.

5.1 DEVELOPMENT AND MAINTENANCE:

Headquarters:

The headquarters will be maintained at Dome Camp. However more buildings will be constructed to accommodate the research officer and his/her team. The old building will also be refurbished for the antipoaching team.

Roads:

The road from Dome village to Sasebonsu and Chichibon will be reopened and made into an all-season laterite road to increase accessibility between the western and eastern sections of the reserve, (see Map 7). The road will also improve the efficiency of the antipoaching team.

Accommodation for staff:

The camp buildings at Congo, Dantibon and Oku need urgent refurbishment to make them suitable accommodation for staff. The construction of accommodation for the staff at Berem and Aframso will be priority to make them perform their duties without interference from landlords. It is also necessary to provide accommodation near Sasebonsu for staff who will be stationed there. It is apparent that the Senior Wildlife Officer has not been very effective in the performance of his duties because he stays in Ejura, 25km from the reserve. Two middle grade quarters will be constructed to accommodate him and a research officer at Dome camp.

Water:

Availability of water in the reserve throughout the year is very essential. Two dams will be constructed within the Restoration Zone for this purpose. The Ghana Irrigation Authority will be contacted for assistance.

Signing System:

All approach roads to the reserve will be sign-posted. Signs will also be erected at strategic places round the boundary to deter illegal encroachment.

5.2 ADMINISTRATION PROGRAMMES:

Staffing:

The 24 protection staff are inadequate to cope with the hostile attitude of the indigenous inhabitants. Eight more people will be engaged to make a total of 32, with the understanding that 8 staff will be stationed at the base camp to constitute the anti-poaching team. A Senior Technical Assistant should be posted there to take charge of the anti-poaching team

The research team will be made up of 1 Wildlife Biologist, 1 Wildlife Ranger, 1 Secretary (Computer-literate) and 2 protection staff. Members of the Planning Team can be called in to assist when the need arises.

Patrolling Equipment:

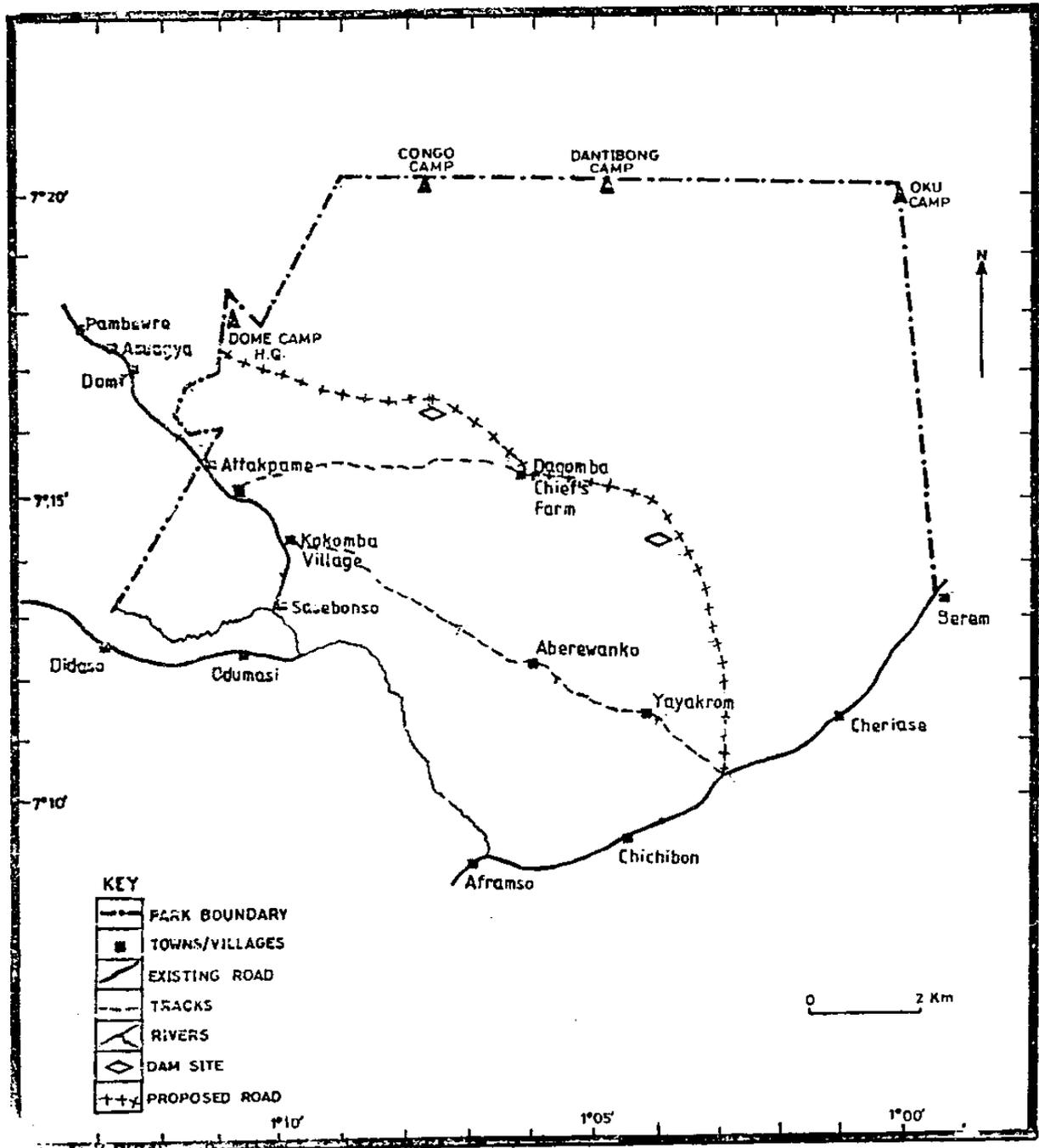
The firearms situation in the reserve is very critical. The two 30/06 rifles and two shotguns are being monopolised by the anti-poaching team based in Dome camp, leaving the rest of the staff at other camps to use cutlasses for patrolling. Each camp will be provided with a firearm and each member of the anti-poaching team will carry a gun with 10 rounds of ammunition per gun. Ten additional guns are, therefore, required to be able to combat the rampant poaching. Other equipment essential for effective law enforcement are water bottles, raincoats and regular supply of protective uniforms.

Transport :

A tractor will be required to transport the anti-poaching team to all sections of the reserve. The Mitsubishi pickup presently at the station will be used for administrative duties. A Land Rover will also be required for the research team.

The present hire-purchase system will continue to avail every camp staff with a bicycle.

MAP 7. DEVELOPMENT MAP OF KOGYAE SNR



5.3 COMMUNITY INVOLVEMENT:

It has been observed throughout the conservation world that if the people who live in or around conservation areas support them, they will help to take care of them. If not, no amount of protection staff can stop them from destroying these areas. We cannot, therefore, continue to exclude these indigenous people who have live in these areas for many years from the management of the resources in these reserve, The involvement of the local people is more pertinent in the case of KSNR because of its size, fragile nature and the fact that part of it is being demarcated as a management zone for the inhabitants. It will be tragic if their cooperation is not wooed for the survival of the only source of environmental monitoring.

All programmes for the reserve must first and foremost fit into the development plan of the Afram Plains. This is necessary to win political support from the constituency as well as at the regional level. To achieve this the WD will have to get involved in the planning process of the District Assembly, At the community level, a Management Advisory Board will be formed to decide on the acceptable activities in the Zone of Influence. Members of the board will include representatives from all the indigenous communities within the zone, the traditional authorities and District Assembly. The Senior Wildlife Officer will be the chairman and technical advisor to the board.

The inhabitants will need a lot of education to understand why there should not be any intrusion into the other parts of the reserve, It will be imperative to establish environmental awareness groups to educate the people on conservation issues. In conjunction with these groups, WD will have to institute an intensive conservation education programme by way of talks or lectures and seminars. These talks will always be accompanied by relevant films or slide shows. The youth at schools will be made environmentally conscious by the formation of wildlife clubs.

5.4 INCENTIVES:

1. Once the Zone of Influence has been demarcated for the indigenous inhabitants of Berem, Cheriase, Chichibon and Sasebonsu, a programme will be initiated to introduce bee-keeping as a commercial venture in the zone. The flowering plants within the Restoration and Strict Nature Zones will serve as the source of the nectar. Rev. Father Roberts of S.M.A Mission will be contacted to give technical assistance by way of training interested people in modern bee-keeping and in finding the market for the honey.
2. Other resources that could be harvested include thatch for roofing, poles and ropes. All this will be restricted to the Zone of Influence and under the control of the Management Advisory Board, Shea nuts and mushrooms will also be allowed to be collected from the reserve.
3. The local people will be given priority access to employment opportunities into WD.

5.5 RESEARCH AND MONITORING

Even though the primary purpose of the establishment of KSNR was for research and monitoring of the floral and faunal changes, no work has been done since it was gazetted about 25 years ago. With the establishment of the research station at the reserve, programmes will be instituted to provide data that will guide management in decision making. The following research topics have been suggested by the biological inventory team.

5.5.1 FAUNA/FLORA:

- Initiate a programme for monitoring the trend of vegetational succession in guinea savanna and the remnant Kujani Forest within the protected zone and the rate of regeneration in the restoration zone.
- Establishment of a fire and non-fire plots to determine its effects on wildlife resources in the reserve.
- The succession of the *Chromolaena odorata* thicket and the reestablishment of the *Antiaris-Chlorophora* forest association.
- The impact of fire on the transitional zone.

5.6 INTEGRATED DEVELOPMENT SCHEDULE

The implementation of this management and development plan has been scheduled over three phases within the five year period.

MANAGEMENT ACTIVITY	DEVELOPMENT PHASE		
	I	II	III
ADMINISTRATION			
1. Draw annual work plans	x	x	x
2. Orient staff to KSNR plan	x		
3. Seek approval to recruit additional rangers	x		
4. Seek approval to recruit biologist	x		
5. Constitute road maintenance gang	x		
6. Operational budget review	x	x	x
7. Inspect all camps for temporary refurbishment	x		
8. Withdraw staff from 3 southern camps to Dome Camp	x		
9. Liaise with and chiefs for evacuation of squatters	x		
10. Implementation of zone plan	x	x	
RESEARCH AND MONITORING			
11. Recruit staff biologist	x		
12. Contact universities for research	x		
13. Set up permanent monitoring plots	x		
14. Establish research endowment			x

	I	II	III
DEVELOPMENT AND MAINTENANCE			
15. Contract Feeder Roads Survey for estimates & drawings	x		
16. Construct interior roads		x	
17. Demarcate Zone of Influence	x		
18. Refurbish old buildings at all camps	x	x	
19. Acquire tractor	x		
20. Contract dams survey to Ghana Irrigation Authority	x		
21. Construct dams		x	
22. Construct accommodation for wildlife biologist & SWO		x	x
23. Construct & equip research centre		x	x
24. Construct & equip visitor centre		x	x
25. Reopen boundary from Atakwame to Afram river	x		
COMMUNITY LIAISON			
26. Educate communities about Zone of Influence		x	
27. Establish Management Advisory Board	x		
28. Establish conservation committees	x		
29. Seek WD representation on District Assembly	x		
30. Educate staff on community relations	x		
PUBLIC LIAISON			
31. Restrict use of road to Sasebonsu	x	x	x
32. Enforce use ethics of Zone of Influence		x	x

APPENDICES

The development of this management plan was achieved through reports from three multi-disciplinary studies in and around Kogyae Strict Nature Reserve. These reports, as they are sizeable, are presented separately and available for reference.

The following reports were produced.

Socio-economic perspective of Kogyae Strict Nature Reserve. Elijah Yaw Danso and Andrew K Agyare, 1994.

The vegetation of Kogyae Strict Nature Reserve. Klaus Schmitt and Mike Adu-Nsiah, 1994.

A Zoological Survey of Kogyae Strict Nature Reserve. Moses K Sam, 1994.