PROPOSED GURA SMALL HYDROPOWER PROJECT

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT

FINAL REPORT

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List of Abbreviations

ASAL	**Arid and Semi Arid Lands**
EATTA	**East African Tea Trade Association**
ERC	**Electricity Regulatory Commission**
ESIA / EIA	**Environmental and Social Impact Assessment**
ESMP	**Environmental and Social Management Plan**
FUM	**Factory Unit Manager**
GEF	**Global Environment Facility**
KTDA	**Kenya Tea Development Agency**
SHP - MHP	**Small - Mini Hydro Power**
MoE	**Ministry of Energy**
NEMA	**National Environmental Management Authority**
WRMA	**Water Resources Management Authority**

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EXECUTIVE SUMMARY

Introduction

In the framework of the Greening the Tea Industry in East Africa initiative executed by the East African Tea Trade Association (EATTA), IED was awarded a contract to carry out full scale feasibility studies for two selected sites: one in Uganda (on Nchwera river – Bushenyi district) and one in Kenya (on Gura river - Nyeri District).

The objective of the 2 proposed Small Hydro Power (below 5MW) projects is to reduce electrical energy use in tea processing industries in member countries of the East African Tea Trade Association (EATTA) while increasing power supply reliability and reducing Greenhouse Gas emissions through the removal of barriers. The project is expected to be implemented for 5 selected tea factories but also preferably with an attached rural electrification component.

Any project that is developed should be justified by being socially desirable, economically viable and environmentally sustainable. It is therefore critical that for any project to ensure that emphasis are put on both environmental and socio-economic impacts. In addition to direct environmental impacts of a project, there are other equally substantial impacts and consequences with respect to the social and environment of the people directly affected by the development project.

To this end an environmental and social impact assessment is always necessary to evaluate the baseline conditions, opinion of stakeholders and/or affected and beneficial communities, predict the likely impacts and establish any required mitigation measures for integration in the project designs and implementation.

Accordingly a request for TOR approval for an Environmental Impact Assessment was submitted on 24th January 2008 to the National Environment Management Authority and the approval was subsequently granted on 14th February 2008. The assessment report detailed herewith addresses the requirements.

Key Findings

The project targets four factories namely Gathuthi, Gitugi, Iriani and Chinga Tea Factories to supply their electrical power needs.

The project is located at the boundary of the Aberdares National Park high in the Gura valley, in Othaya division, Nyeri District, Central Province about 220 km from Nairobi. The project will cover an area of about 5 ha and have a water canal about 6 km long, of which 2 km will be through gazetted forest and the rest through tea farms. The power house is located close to Munyange village

The following briefs are the environmental and social impacts identified

1. Vegetation cover degradation caused by the removal of trees from the intake and canal route within the forest
2. Removal of vegetation and clearance from canal route, power house and forebay sites along farms, some with tea bushes
3. The community expressed safety concerns over having an open waterway canal
4. There are significant risks of pollution of the abstraction points for construction water
5. Positive impacts from job creation
6. Risks of pollution from oil spills, waste disposal of oils, grease etc from construction equipment and activities
7. Risks of pollution from the spoiling of excess excavation materials
8. Risks of pollution from dust from construction activities.

Recommended mitigation measures

1. Creation of a tree nursery. Initiate a trees nursery and tree planting programme in collaboration with the tea factories, the Kenya Forestry Service and relevant government organs, financiers and experts.
   Undertake top-soiling and grassing programme for any access road reserve
2. Develop and document Standard Operating Procedures (SOPs), schedules and supervision guidelines for the project for controlling the risks from oil spills, dust, water abstraction for construction etc
3. Address safety concerns of the community for waterway canal crossings either through covering of the canals or provision of specific crossings both for humans and livestock

4. Regular interaction and discussions with the community. A position of environmental manager/officer be created during construction to oversee to oversee environment and social management of re-planting of trees and other vegetation along the canal route, the recovery of any eroded areas, enhanced safety measures and general liaison with the community during and post construction period

An Environmental and Social Management Plan (ESMP) has been developed and designed to address the factors affecting construction including upholding the legal and environmental provisions at all times during the construction and post construction period.

Conclusions

On the basis of the assessment undertaken, there are no major environmental negative impacts and the project benefits overrides the anticipated environmental and social impacts. A comprehensive environmental and social management plan has provided a schedule of activities to achieve and guide these mitigation and legal measures
The detailed feasibility study for Gura MHP Project shows the project is economically and technically viable

1.0 Project Description

1.1 General Project Background

Kenya Tea Development Agency (KTDA) is the single largest tea producer in the world and accounts for 61% of tea produced in Kenya, managing some 54-tea factories

In view of rising energy costs the Agency has been exploring ways to reduce the energy costs of the production process. In addition the factories they manage experience frequent electricity supply outages from the existing supply from the national power utility

Four factories namely Gathuthi, Gitugi, Iriani and Chinga Tea Factories are desirous of developing a mini hydro power plant along the Gura River to supply their electrical power needs.

A request for TOR approval for an Environmental Impact Assessment was submitted on 24th January 2008 to the National Environment Management Authority (NEMA) and the approval was subsequently granted on 14th February 2008. The approvals are attached Appendix 1

1.2 Project Location

The project is located at the boundary of the Aberdares National Park high in the Gura valley, in Othaya division, Nyeri District, Central Province about 220 km from Nairobi. The project will cover an area of about 5 ha and have a water canal about 6 km long, of which 2 km will be through gazetted forest and the rest through tea farms. The power house is located close to Munyange village.

1.3 A Comparative Advantage of the Project

The project development is in accordance with Gathuthi, Gitugi, Iriani and Chinga Tea factories long term development of self reliance for energy. This is also in line

with the Ministry of Energy strategy for development of mini-hydro on suitable sites to serve areas not covered by the main grid.

The project power will help supplement the national supply and provide continuous and reliable power to the tea factories. This will ensure quality control of tea produced and lower the cost of production.

1.4 Key Project Components

The main features of the proposed project are as follows:

a) Power Production
   - i) Construction of a concrete weir across Gura river
   - ii) Construction of a 6 km water canal
   - iii) Penstocks to convey water from the intake to the turbines
   - iv) Generating plant
   - v) Power-house

b) Switchyard and Distribution lines
   - i) Equipment including transformers and power lines
   - ii) Transmission poles
   - iii) Way leaves

c) Social Amenities and Benefits

   The communities participating in the project will be supplied with the following options:
   - i) Water
   - ii) Foot path bridges
   - iii) Tree seedlings

A map of the Gura MHP project is shown in Figure 1.

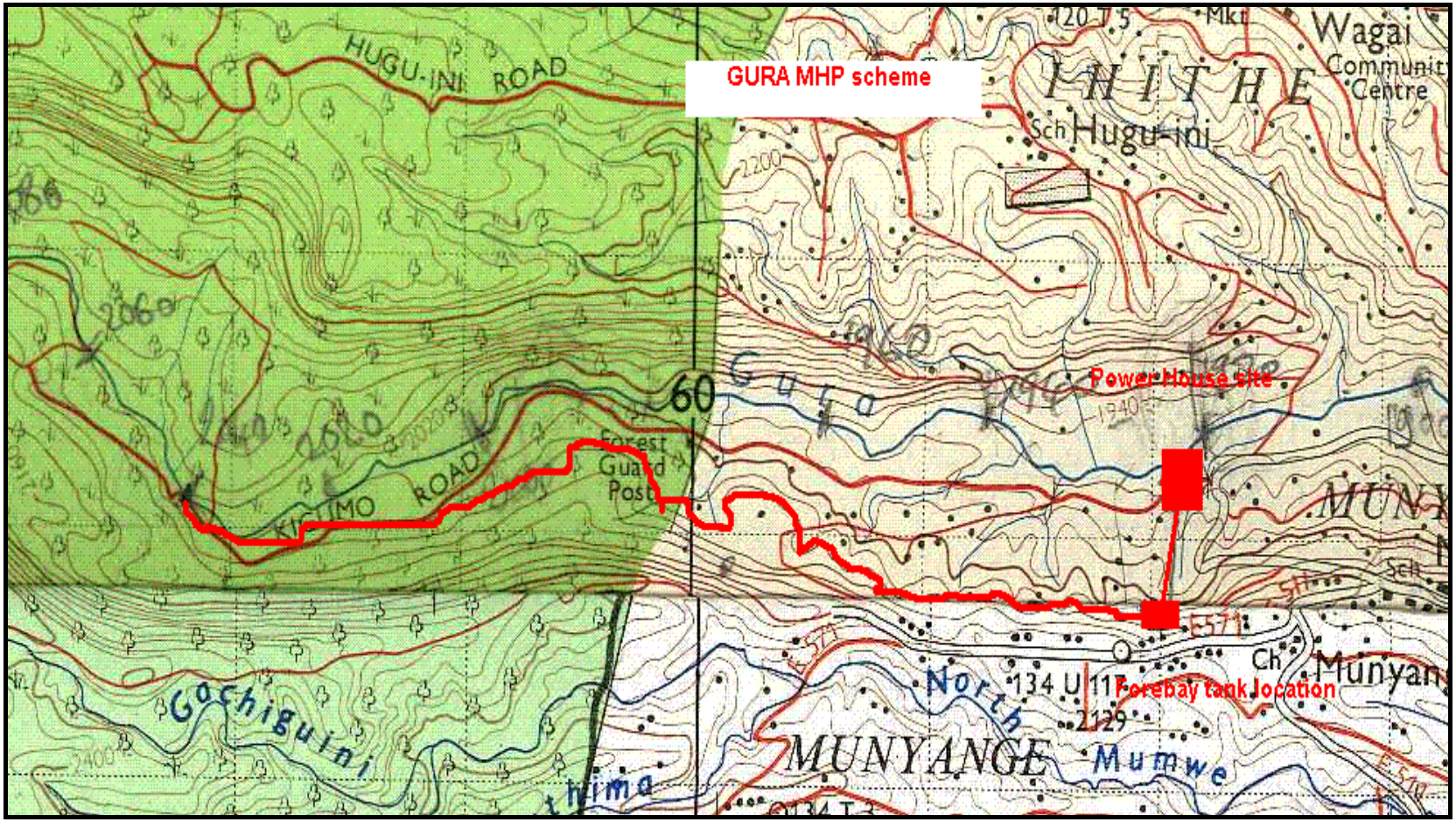


Figure 3: Gura MHP scheme map

1.5 The ESIA Team

The following are the EIA multi – disciplinary team who undertook the assessment

SN	Name	Responsibilities/Tasks
1	**Richard J. Mwendandu** (Environmentalist) NEMA Lead Expert	- EIA Team Leader - Coordination of the EIA team - EIA Lead Consultant in EIA screening and scooping, baseline surveys, determination for the potential impacts of the project, development of Environmental Monitoring Plan, compilation of the EIA study report
2	**Kiragu Mugwe** Civil/Energy Engineer	- Compile and synthesize and evaluate all data on the project design, construction and operation stages - Provide a Management Plan for the project
3	**Diana Kimani** Socio-Economist	- Compile, synthesize and evaluate all existing data on socio-economics in the project area. - Assess direct and indirect impacts of the project on socio-economic conditions in the project area - Identify and propose mitigating measures to reduce/eliminate negative environmental conditions in the project area. - Provide inputs to the Environmental
4	**Peter Gota** Surveyor	- Undertake all survey works in relation to the project. - Clearly identify and mark way leaves

2.0 Project Design

2.1 Intake

The weir is a non-storage run-of-the-river diversion structure and will be located upstream in the Forest approx 2 km from its boundary (Forest guard house). Level of the weir 2066 m

The following inherent design characteristics are adopted for the diversion weir structure:

- Ogee-type spillway weir where the entire crest length (35 m) serves as the principal spillway in case of overflow;
- Three (3) meter-high weir height from upstream apron slab to dam's crest;
- Boulder-core with concrete binder for the main Ogee core with 0.25 meter (m) concrete wearing surface;
- Provided with 2 sluice gates:
  (1) a simple one 3.5x3.5 m in the right bank. Its function is to flush off sediments from the upstream to the downstream locations and also to act as secondary spillway, and
  (2) a small one (dim.0.8x0.8 m) controlled by the upstream water level, to allow the residual flow downstream (416 l/s);
- Provided with upstream and downstream apron slabs with penetrating cut-off walls beneath the river to arrest excessive seepages;
- Provided with complete intake structure (towards the settling basin and the canal) with steel trash racks to prevent large debris from entering intake, lifting mechanism for gate control and sediment control device

The settling tank proposed to clean the water from its suspended solid residues (TSS), will be laid down parallel and on the right bank of the river and upstream of the waterway. In addition, the settling basin plays also safety and regulation roles to protect the canal:

The tank will have the following characteristics

- Size 34.6 x 5.55 m
- Height between 5.0 and 5.3m
- Storage volume 231m^3

- Length of spillway 11m

Plate 2 in Appendix 2 gives a picture of the intake location.

2.2 Channel

The waterway channel is an important part of any hydropower system and its function is to convey water from the intake of the weir and the settling basin to the forebay and down to the turbine through the penstock line. The channel will follow the line given in the Gura scheme map between 2,064.77 m and 2,059.72 m at the forebay location and will have the following characteristics

- The total length of the waterway is 6 665 meters with a slope of 0.59 mm/m and consists mainly in cuts on the right bank of the river
- Its profile is essentially trapezoidal (over 6,480 m out of 6,665 m), except when crossing the specific ditches (marked) where the canal shall be rectangular and carried out on posts (over 185 m out of 6,665 m).
- Dimensioned for the capacity of 3.0 m3/s (nominal capacity of 2.50 m3/s with a safety factor of 20%), the height of normal water level in the canal is identical for the two profiles: 1.23 m.
- With that flow capacity, the velocity of water flow in the trapezoidal profile is 1 m/s.
- The free board suggested is 0.60 m.
- We propose a concrete lining for the trapezoidal sections. The role of this coating is multiple:
  1. it must ensure the sealing,
  2. avoid the erosion of the closeness soils and facilitate the marling conditions
  3. improve the condition of flow,
  4. ensure a long durability of the canal
  5. reduce maintenance.

- In certain sections and according to the closeness soils, this coating could be drained in the foundation raft (draining and/or filtering refill in alluvia) and on the walls of the canal (porous concrete trenches),

water of drainage being evacuated by a longitudinal collector located under the foundation raft. According to the nature of the soils encountered, some joints could be placed in the coating. The purpose of these joints is to locate the cracking of the concrete slabs due to the withdrawal, the thermal expansions and the possible packing down.

- A service path of three (3) meters broad and ditches (especially for the cut profiles) will skirt the canal on its course. A gutter of remote control posed on sand and connecting the weir to the forebay and the power station will be laid out close to the canal edge.
  (cf. Plate 1 in Appendix 2)

2.3 Forebay

The projected forebay is a collector-distributor, or small pond, receiving the water from the canal and distributing it to the penstock.
The Gura SHP's forebay is long and width enough to accommodate the intake, penstock, spillway or the scouring gate. It should have also a certain storage volume capable of regulating the flow.
In SHP plants, the draw down/up of the water during transitory phenomena can be considered as small. For example, when the plant is suddenly shut down, a hydraulic bore or surge takes place while the canal is still supplying water to the forebay. Nevertheless, this will happen during an emergency and will be considered. Because of it, a side spillway is provided in the forebay. Then the complicated procedures associated with unsteady flows can be avoided.
Then the side spillway of Gura's forebay is designed for maximum discharges into the canal.
Likewise, to accommodate the deposition of silt, the entrance elevation of the forebay's intake is much higher than the floor base. As a result the maximum water depth picked in the proposed forebay is approximately 3.0 m, and the mean velocity is 0.20 m/s, so that it can be expected to settle out effectively

the harmful particles in this work. Scouring of the forebay is scheduled during shut-down of the plant.

Additional parameters are

- Length/width 15.5 x 3.75 m
- Maximum height of settling basin 5.5m
- Length of spillway 9.5m

2.4 Penstock

The penstock pipe is a steel pipe and will have a cross section of 900 mm diameter but will be buried into the ground. Its approximate length is 400 m.

2.5 Power House

The powerhouse: will occupy about 250m² on the floor.

The power house consists of a building which shelters the arrival of the penstock (diameter 900mm reduced to two pipes 600 mm diameters), the group turbine-generator, the control boards, controls and automatism necessary to the energy generation, the room of the main transformer, a sound-proof office and sanitary.

A screen of 18.33 meters (2 times 3.00 meters + 6.16 and 6.17 meters) x 10.5 meters x 4.00/5.50 H (roof with double slope) is proposed for the civil engineering of the building, with a position of the axis of entering penstock counted with 4.6 and 11.10 meters from the western pinion of the building.

The Power house will be partially buried in the natural right edge-slope of Gura river.

3.0 Environmental baseline information

3.1 General status

The project is located at the boundary of the Aberdares National Park high in the Gura valley, in Othaya Division, Nyeri District, Central Province about 220 km from Nairobi. Nyeri District administrative map showing the boundaries is attached Appendix 3

The majority of the population in Mathira, Tetu, Mukurwe-ini, Othaya and Kieni Divisions practice agriculture and livestock farming. The population of Municipality Division works in the formal and informal sectors as well as in small-scale urban agriculture and livestock production.

The main physical features of the district are Mount Kenya (5,199m) to the east and Aberdare Range (3,999m) to the west. The western part of the district, is flat, whereas further southwards, the topography is often characterised by steep ridges and valleys, occasionally interrupted by hills such as Karima, Nyeri and Tumutumu. To some extent these hills affect the pattern of rainfall, thus influencing the mode of agricultural production in some localised areas.

The district experiences equatorial rainfall due to its location and being within the highland equatorial zone of Kenya. The long rains occur from March to May while the short rain falls from October to December although sometimes this pattern is occasionally disrupted by abrupt and adverse changes in climatic conditions. The annual rainfall ranges from 500mm in the dry areas of the Kieni plateau to 1,500mm in the Aberdare Hills and areas around Mt. Kenya. The rainfall in the district is generally between the long and short rains the major reason being the influence of the rain shadow caused by the Mt. Kenya and Aberdare range. The annual rainfall therefore varies from 600mm to 1,500mm during the long rains and 1,200mm to 1,600mm during the short rains. The temperature in the district are lower in the higher areas

like the slopes of the Aberdare ranges which experience cold of up to 13˚C but can go down to 8˚C in the cold seasons of June/July; while in the low areas of Mathira, Tetu and Othaya, the temperature is about 7˚C. Kieni east and west are the hottest regions in the district.

3.2 Topographic trends

In Kenya, 83% of the country is classified as arid and semi-arid (ASAL) and falls under agro-climatic zones IV-VII. The remaining 17% is classified as medium to high potential areas and fall under agro-climatic zones I-III. The project area falls under climatic zone II classified as sub-humid

The topography can be described as Volcanic Footridges meaning a landform that consists of broad parallel, rather convex interfluves alternating with deeply incised Valleys, often with convex slopes and with a narrow valley bottom.

3.3 Geology, drainage, and soils

The geology around Gura is defined by the Aberdare Mountain range. This mountain range comprises peaks Nyandarwa (12,816 feet) and the Elephant (11,900 feet). Moorland, which generally occurs above 11,000 feet though scattered trees occur on slopes above this altitude, is commoner on Niandarawa than on the Elephant. The lower slopes of Niandarawa and the Elephant are forested with trees and bamboo, the latter seldom growing on steep slopes or above 10,000 feet. At lower altitudes, particularly along water-courses, dense bush includes numerous, sometimes giant varieties, of stinging-nettles. North Lereko (Mutubiu) and South Kereko (Kantuere), two smaller mountains north of Niandarawa, are also covered by dense vegetation concealing the underlying rocks, which are believed to be basaltic agglomerates.

The mountains have a radial drainage, but once the rivers reach the Kinangop, mastery of the streams is disputed between the headwaters of the north-westerly flowing Mdawa and south-easterly flowing Chania system rivers. Nyandarwa is the source of the Chania and Maragua rivers, the divide between them being very small, while the Gura river rises in the east-facing slopes of Lereko further north.

The Elephant, composed of basaltic agglomerates, has prominent cliffs up to 500 feet in height on its western side. Numerous basaltic dykes radiate from Nyandarwa, though a pronounced east-west concentration is seen on the moorland. Similar dykes on the Elephant and in the forested parts of the mountains are not so easily observed owing to Ithe thick cover of soil and vegetation.

The geology comprises mainly non-porphyritic Laikipian basalts of of middle Pleistocene to Pliocene age. The soils are deep red nitisols

3.4 Land use patterns

The project area is a high potential area characterized by tea and coffee growing. A bit of subsistence farming mainly for domestic use is also practiced. However, tea is the dominant crop in this upper zone with some dairy farming and rain fed agriculture mainly at subsistence level.

3.5 Forest, Products and Wood Energy

The weir for the intake and a significant part of the channel will be in the Forest.

The Aberdares Ranges are one of Kenya's five main "water towers" and play a critical role in supporting the country's economy. Map of forests in Kenya is shown below in Figure 2.

The Range stretches over 125 kilometres from Nyahururu in the North to Limuru in the South. The Aberdare Forest covers over 250,000 Ha over the range with the upper reaches designated as Aberdare National Park

The Aberdares host a wide variety of plant species. A study carried out in 1986-88 identified 778 species, subspecies and varieties in the Aberdare National Park alone (Schmidt, 1991).

Common hardwood tree species include Camphor (*Ocotea usambarensis*), Cedar (*Juniperus procera*), Podo *(Podocarpus*

The next table provides an overview of the vegetation cover with a description of the main vegetation types[1].

Table 4: Description of the main vegetation types

Vegetation zone	Altitude (m asl) / Location	Characteristic tree (and shrub) species
Montane forest zone: - Moist forest	1900 - 2500 / East 2100 - 2500 / South-East	- *Cassipourea malosana*, *Ekebergia capensis*, *Teclea nobilis*,*Calodendrum capense*, *Podocarpus latifolius, Nuxia congesta - Ocotea usambarensis*, *Macaranga kilimandscharica, Neoboutonia macrocalyx, Tabernaemontana stapfiana, Prunus africana*
- Dry forest	1800 - 2400 / South-West 2400 - 3300 / West 2300 - 3200 / North, North-East	- *Juniperus procera, Calodendrum capense, Teclea simplicifolia - Juniperus procera*, *Olea europaea*(*africana*), *Podocarpus falcatus*, *Nuxia congesta*
Bamboo zone	2400 - 3000 / East, South-East 2700 - 3300 / West	- *Arundinaria alpina*with scattered trees, including *Podocarpus latifolius* and *Nuxia congesta*
Hagenia-Hypericum zone	2950 - 3500 (discontinuous)	- *Hagenia abyssinica*, *Hypericum revolutum*, *Rapanae melanophloeos*
Ericaceous zone	2900 - 3560 (discontinuous)	- *Erica excelsa*, *Erica trimera*, *Erica arborea*, *Cliffortia nitidula, Helichrysum nandense*, *Stroebe kilimandscharica*

[1] *The description of the main vegetation types is based on the work by Ng'ang'a (1990), Schmidt (1991) and KIFCON (1994).*

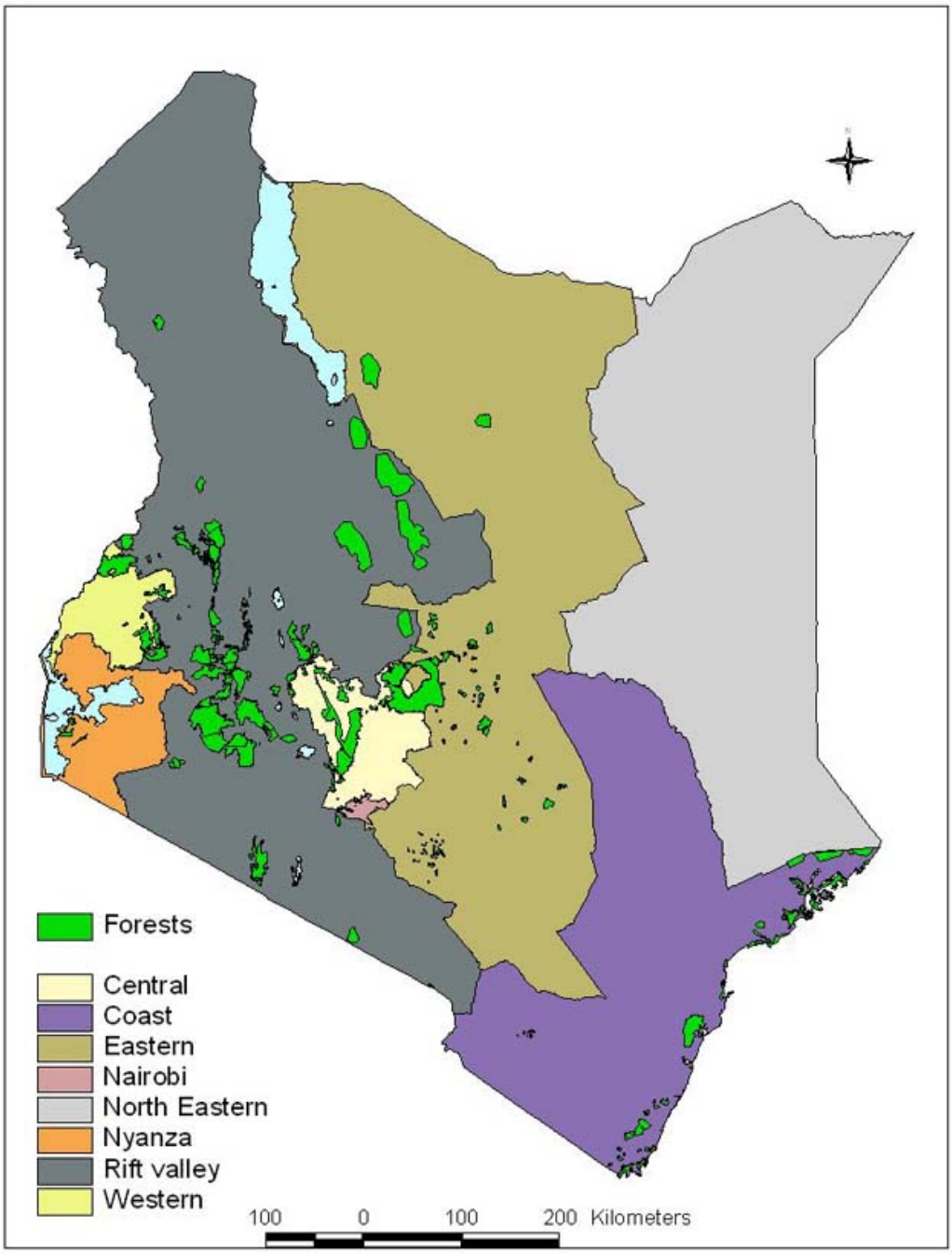


Figure 4: Kenya; Distribution of forest in provinces

The canal is located where the shamba system was practised and attempts have been made at replanting thus the trees to be affected will be mainly re-planted plantation species. The study identified the following species which will be affected by the canal

Table 5: Affected tree species

Item	Description	Quantity (nos)
1	Cypress - Cupressus lusitanica	200
2	"Mitundu"	80
3	Eucalyptus celigna	100
4	"Miiri" - *Prunus africana*	10
5	"Mikarariki"	20
6	"Miirere"	25

In addition the community use the forest for livestock grazing and collection of fuel wood for domestic use.

There were anecdotal indications from discussions with the community that there have been significant drop in illegal logging and charcoal burning activities in the forest since the ban was effected in 2002 with more stringent monitoring by the Kenya Forest Service (and its predecessor the Forestry Department)

4.0 Social and Economics Information

4.1 General social considerations

Any project that is developed should be justified by being socially desirable, economically viable and environmentally sustainable. It is therefore critical that for any project to ensure that emphasis are put on both environmental and socio-economic impacts. In addition to direct environmental impacts of a project, there are other equally substantial impacts and consequences with respect to the social and environment of the people directly affected by the development project

Wide-ranging discussions were held with all the 4 Tea Factories and additionally with the District Administration and in particular the District Development Office whereby the information was obtained on current social economic data and attached is Appendix 7 with detailed socio-economic data from the district fact sheet and from survey templates

4.2 Existing socio-economic situation in the project area.

The project is located in Mahiga Location of Othaya Division in Nyeri District. The division has an area of 171 km^2 comprising 5 locations and 20 sub-locations with a population density of 516 persons/km^2 compared to a district average of 202 persons/km^2 (National Census; 1999)

Nyeri District is a predominantly agricultural area with small holder farms of average size of 0.4 ha. The main cash crops are tea, coffee with some horticultural crops (French beans, capsicum etc) and main food crops produced comprising of maize, beans, Irish potatoes, bananas and cabbages.

However though socio –economic indicators like literacy show literacy levels of 96% and 82% for males and females respectively, as with many parts of Kenya unemployment is high at average of 40% over the district.

There are four main urban centres; Nyeri (which is also the Government headquarters for Central Province) , Karatina, Othaya and Naro Moru with combined population of 175,000.

Some typical district information is tabulated below

Table 6: Typical District information (2002)[2]

Item	Description	Remark
1	Population (2002)	677,216
2	Population growth rate	0.8%
3	Average density	202 pers./km^2
4	Total number of households	168, 786
5	Average household size	4
6	Average farm size	0.6Ha
7	Population growth rate	0.8%
8	Life Expectancy: Average	46 years
9	Sectoral contribution to household incomes- Agriculture	53%
10	Number of households with access to piped water	73%
11	Total enrolment rates – Boys - Girls	89% 86%
12	Number of households with electricity connections	11,053
13	Number of trading centres with electricity	74
14	%rural households using solar power	0.4%
15	% households using firewood/charcoal	80%
16	% households using kerosene, gas or biogas	90%

4.3 Engagement mechanisms for integrating the community in the project.

(a) Establish community sensitization forums

Once it has been determined that the project will proceed formal stakeholders sensitization meeting should be held and agreements reached on regular mechanisms to inform the community on progress of the project

(b) Identify key areas of the project which have community roles and engage the communities in those areas

During the stakeholders sensitization meeting community roles will be discussed and developed where they can be engaged e.g. in employment where possible, development and nurturing of tree nursery etc

[2] Source: District Development Office, Nyeri, 2002.

5.0 Consultative Public Participation

5.1 Introduction

It has become prudent practice to consult all stakeholders and more so the communities directly affected by development projects to hear and understand their views prior to implementation and adopt the recommendations in the designs thereof.

In this regard a meeting was called jointly by the Gathuthi Tea Factory Ltd and local consultants Que Energy Ltd to inform and sensitize the farmers about the proposed small hydro power development along Gura River. The meeting brought together the local community of Gituiga sub–location[3] and its environs, the Provincial Administration, the Director and Management of Gathuthi Tea Factory and local consultants Que Energy Ltd. The meeting was held at the Gituiga[4] Tea Buying Centre. In addition the consultants had carried out a social surveys and interacted adequately with the community and sensitized them on the project aims

The meeting was well attended and attached Appendix 4 is the list of participants.

The meeting was moderated by the Director of Gathuthi Tea Factory ably assisted by the Assistant Chief and the Factory Unit manager of Gathuthi Tea Factory

In addition the Consultants during the topographical and cadastral surveys regularly engaged the community in discussions on what the project entailed. Accordingly a survey was carried out along the whole project locations and typical templates are attached Appendix 5

5.2 Summary of issues arising from the consultations

The FUM and the consultants led the meeting through the genesis of the proposed project and broadly the way it will be constructed and below are the issues arising from the consultations

5.2.1 Compensation

The community were keen to understand how they will be compensated for the land and crops they will lose.

The consultants was explained that an independent Government Land Valuer, or if the community strongly felt necessary engage a private Land Valuer , who will carry out the exercise and tabulate the values therein of the land and crops they will forfeit.

[3]The Kenyan administrative set up is District, followed by Division then location, sub-location finally village.

[4] Gituiga Tea Buying Centre is one of the tea collection centre for Gathuthi Tea Factory

The consultants added that the value of most items is now well known e.g. the factory has a list with values of tea bushes of the different maturities and these are the figures the valuer would base his compensation amount on. In addition the value of land would be based on recent land sale values

The community requested the project to evaluate the possibility of supplying them with water in lieu of cash or supply of power to the plots directly affected by the construction through loss of land.

5.2.2 Safety

The community strongly opposed having an open channel as they felt will be a risk to themselves, their children and livestock. In addition they wanted to be advised where the crossings over the channel would be. The Consultants pointed out that the issue was of risk management and that covering the channel or provision of a fence would carry a significant added cost to the project.

However the community felt an open channel posed a grave danger to them and the consultants to evaluated the added costs to the project and the issue was to be evaluated further by the consultants with a view of accommodating their concerns

5.2.3 Employment Opportunities

The community through the Director noted that the locals will benefit from employment opportunities which will ensue from the construction of the power project. In addition the community agreed there would be long term benefits from the transfer of skills and continued employment to run and maintain the project once completed. However the community urged that locals be given priority when hiring of labour. The consultant confirmed it is the Government policy that all unskilled labour must be sourced from the locality of the project and in any case no contractor wishes to bring external skills unless necessary as it is an additional expense.

5.2.4 Conclusion

The meeting agreed that the project is beneficial to the community and noted that it was an honour to be the first project to benefit for a full study from the GEF/EATTA facility.

The participants requested and it was agreed consultations should be carried out especially prior to commencement of construction works.

6.0 Legislative and Regulatory Considerations

Below are the pertinent national regulations and standards governing environmental quality, health and safety, protection of sensitive areas and endangered species etc. This will set environmental legal and institutional framework for the future of the management of the proposed project.

6.1 The Environmental Management and Coordination Act, 1999

The EMCA Act Part V section 42, subsection 1 directs that:

> "No person shall, without prior written approval of the Director-General given after an environmental impact assessment, in relation to a river, lake or wetland in Kenya, carry out any of the following activities – (a) erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, or under the river, lake or wetland; (b) excavate, drill, tunnel or disturb the river, lake or wetland; (c) introduce any animal whether alien or indigenous in a lake, river or wetland; (d) introduce or plant any part of a plant specimen, whether alien or indigenous, dead or alive, in any river, lake or wetland; (e) deposit any substance in a lake, river or wetland or in, on, or under its bed, if that substance would or is likely to have adverse environmental effects on the river, lake or wetland; (f) direct or block any river, lake or wetland from its natural and normal course; or (g) drain any lake, river or wetland. "

Subsection 2 further adds:

> "The Minister may, by notice in the Gazette, declare a lake shore, wetland, coastal zone or river bank to be protected area and impose such restrictions as he considers necessary, to protect the lake shore, wetlands, coastal zone and river bank from environmental degradation. In declaring a lake shore, wetland, coastal zone or river bank a protected area, the Minister shall take into consideration the following factors – (a) the geographical size of the lake shore, wetland, coastal zone or river bank; and (b) the interests of the communities resident around the lake shore, wetland, coastal zone or river bank concerned."

Further according to section 45 of the Act, hilly or mountainous areas are at risk and District Environmental Committees are encouraged to initiate self-help conservation activities for such areas with section 47 giving further guidelines on these measures.
The conservation and management of forests is covered under sections 48 to 51 which state inter alia;

> "48 (2) The Director-General shall not take any action, in respect of any forest or mountain area, which is prejudicial to the traditional interests of the indigenous communities customarily resident within or around such forest or mountain area.";
>
> "51 (b) The Authority shall, in consultation with the relevant lead agencies, prescribe measures adequate to ensure the conservation of biological resources in-situ and in this regard shall issue guidelines for the selection and management of protected areas so as to promote the conservation of the various terrestrial and aquatic ecosystems under the jurisdiction of Kenya".

6.2 Water Act 2002

Section 25 part 1 describes the Water rights and permit requirements and states

> "A permit shall be required for any of the following purposes:
>
> (a) Any use of water from a water resource as provided by section section26
> (b) The drainage of any swamp or other land
> (c) The discharge of a pollutant into any water resource
> (d) Any purpose to be carried out in or in relation to a water resource which is presided by the rules made under this act to be a purpose for which a permit is required"

Additionally Sections 28, 29 and 30 give further particulars on the specific licence and permit requirements
Accordingly the proponent through the Regional Manager, KTDA applied for an abstraction permit to the Regional Manager of the regulatory authority; Water Resource Management Authority (WRMA) and the specific requirements are listed below and copy of letter is attached Appendix 6:

1. Cadastral maps showing the location of the factories and points of intakes for the water works
2. Two topographical sheets 134/2 showing the points of intake

3. Title deeds for the plots where the water works will be constructed
4. Certificates of incorporation
5. Letters of no objection from owners of plots in (3) above if plots are not owned by the applicant themselves
6. The feasibility study report
7. Application fee of Kshs 42,000.00
8. A letter of no objection from Kenya Forestry Service for entering the forest

6.3 Forest Act 2005

The part of the project in the Aberdare Forest will be governed by the new Forest Act 2005. Some of the sections applicable to authorization are inter alia;

Part 3 section 32 which states:

"(1) Any forest community, or person who is desirous of utilizing or conserving any grove or forest which is part of a nature reserve for cultural, religious, educational, scientific or other reasons shall submit an application, in the prescribed form, to the board through the forest conservation committee for the area in which the nature reserve occurs.

(2) Upon receipt of the application referred to in subsection (1), the Board shall make inquiries regarding the application, including the authenticity of the application and the suitability of the site vis-a –vis the activities for which the application is made, and, based on such inquiry, the Board may within three months of receipt of the application –

a) grant the application as requested;
b) grant the application on specified terms and conditions; or
c) refuse to grant the application, giving reasons for such refusal.

Section 39 which states:

(1) Where the Board is satisfied that utilization of a forest can be done through the granting of concessions, the Service may, by licence, grant the same subject to an Environmental Impact Assessment Licence in accordance with the Environmental Management and Coordination Act, 1999.

(2) In addition to subsection (1), the grantee of a concession shall:-

a) comply with the guidelines or management plans prescribed by the Service;

b) protect the concession area from destruction and encroachment by other persons;

c) ensure that the forest areas under his management are maintained for the conservation of biodiversity, cultural or recreational use;

d) maintain the physical boundaries of the concession;

e) take precautions to prevent the occurrence and spread of forest fires in connection with any or all operations within or outside the concession area; and

f) ensure that all structures and facilities constructed or operated by and in connection with any activities are maintained according to the conditions of the licence.

(3) The licence shall indicate the nature of the concession, including its physical location and boundaries, and the purpose for which it is granted.

(4) The Board may withdraw a concession granted under this section where a grantee breaches any of the conditions prescribed under subsection (2).

(5) A grantee of a concession under this section shall be held personally responsible for any damage, including the negligence of his employees, arising directly from his operations on the land for which the concession has been obtained.

6.4 Health and safety regulations; Public Health Act (Cap 242)

Part IX section 115 of the Public Health Act (Cap 242) states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or waster water flowing or discharged into a watercourse is deemed as a nuisance. Part XII Section 136 states that all collections of water, sewerage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances.

This Act generally addresses matters of sanitation, hygiene and general environmental health and safety

6.5 The Energy Act 2006

The licensing of generation and transmission of electricity falls under the regulatory authority of the Electricity Regulatory Commission (ERC) under the Energy Act 2006. The requirements are under Part III section 27 which state :

"Requirements for a licence or permit.

27. (1) Subject to the provisions of this Act, a licence or licences as the case may be, shall be required for the–

(a) generation, importation or exportation, transmission or distribution of electrical energy; or

(b) supply of electrical energy to consumers:

Provided that for undertakings involving a capacity not exceeding 3,000 kW, the provisions of subsections (2), (3) and (4) shall apply.

(2) A Permit shall be required in respect of all undertakings–

(a) intended for the supply of electrical energy to other persons or consumers; and

(b) with a generating plant of over 1000 kW intended for own use.

(3) Any undertaking operating pursuant to a permit granted under this Act shall–

(a) in any case where conveyance of electrical energy to or from any transmission or distribution network is possible, meet the minimum requirements of the owner or operator of the transmission or distribution network as approved by the Commission, and the owner or operator of any such undertaking shall inform the network owner or operator of all connected load and generation equipment that might have material effect on the network; and

(b) be subject to such conditions as may be specified by the Commission

There are the other sections namely sections

Additional requirements for implementation namely applications, transfers electrical installation etc are contained from sections 28 to 42 of Part III.

7.0 Environmental Management Plan

7.1 Overview

The project is geared towards provision of power for Gathuthi, Chinga, Gitugi and Iriani Tea factories, and for people living within the area and the neighbourhood of the project at large

The project should also observe environmental requirements in accordance with legal and statutory requirements

To achieve this goal, acceptability by a majority of the beneficiaries with minimal effects to the physical environment will require to be integrated in the project through constant consultations, evaluations and review of the design aspects where applicable

7.2 General impacts

Among the factors that need to be considered in this particular project implementation and its post evaluation initiatives will include;

a) Preservation of the natural beauty of the forest and countryside along the canal route.
b) Control of soil erosion and siltation of Gura River and other public sources of water
c) Enhancing integration of environmental, social and economic functions in the project design and implementation
d) Incorporation of safety provisions in the design and construction including accessibility to the users, livestock…etc.

The project is an economic good for Tea factories, the people living in the area and the country in general and no significant negative issues are anticipated on environmental, economic and social well-being on the whole. However the community expressed strong feeling about safety along the canal and this needs to be addressed.

In order to implement the management plan, it is recommended that a position is created of appropriate expertise to oversee environment and social management of re-planting of trees and other vegetation along the canal route, the recovery of any eroded areas, enhanced safety measures and general liaison with the community

during and post construction period. This environmental manager/officer would be under the responsibility of the consultants superintending the construction of the project and the management of the power company thereon should their services continue to be required.

7.3 ESMP matrix

The following is a matrix (tables 4 a-b-c) providing specific actions on mitigating significant impacts with the actions are recommendations on timeframe and those responsible in leading the way. It is important to note that costs are estimated and will be firmed up by each specific activity at time of implementation.

To keep track of the successes of the management plan, targets and monitorable indicators have also been provided.

Table 4a: Environmental Management Plan (Part 1)

Item No.	Anticipated Impacts and Sources	Proposed Actions	Responsibility and Timeframe	Costs (Kshs)	Targets to Achieve	Monitorable Indicators
1	Degradation of water sources: • Over-abstraction of water, • Water quality from siltation, hydrocarbon residuals, • Effects on dependants (people and aquatic systems), Sources: • Silt from earth moving, • Oil and grease construction machinery, Site workshops and machinery maintenance areas,	• Observe stipulated utilization regulations (water abstraction, slope excavations, etc.) • Monitor standards of at the construction camps, • Establish a mechanism for waste collection, storage, transfer and disposal.	The contractor, The Project Resident Immediate and throughout project period.	Approx 2,000,000.00 For the whole Project period	• Minimal discharging into water bodies, • No effects on physical status of water quality, • Centralised collection of solid wastes at camps and final disposal	• Physical quality downstream of road, • Status of rivers and wetlands downstream of the roads reserve • Complaints the neighbouring communities or the authorities.
2.	Air quality: • Dust and particle matter, • Visual disruption, • Smoke and residual emissions, • Inhibition of crop pollination (reduced farm productivity), • Surface depositions, • Bronchial and eye problems the communities. Sources: Construction activities moving and operations).	• Invest in constant watering of access roads and other areas construction, the diversions and dry materials, • Establish dissemination process to the communities on potential dusty conditions, • Keep inevitable conditions and/or emissions as short as possible,	The Contractor The Project Resident Throughout construction period	Approx 2,000,000.00 Payable monthly against activity	Nil visible particulate matter in the air.	• Dust level the project, • Exhaust fumes form construction .

Table 4b: Environmental Management Plan (Part 2)

Item No.	Anticipated Impacts and Sources	Proposed Actions	Responsibility and Timeframe		Targets to Achieve	Monitorable Indicators
3	Vegetation cover degradation: • Removal of trees from the intake and canal route • Removal of vegetation clearance from canal route, power house and and forebay sites, Sources: Forest and farms	• Initiate a trees nursery and tree planting in collaboration with the tea factories, the Kenya Forestry Service and relevant government organs, financiers and experts. • Undertake top-soiling and grassing programme for any access road reserve	The Contractors Resident Engineer	Approx 10,000,000.00 To also cover maintenance period post construction	Reinstate the vegetation cover along the project to near its original status. Re-planting and well established trees by project end	Well established trees Community participation Greenery along the route of access roads.
4	Environmental Pollution: • Erosion and loss of soil, • Siltation of water bodies, • Pollution of water and soil (turbidity and hydrocarbons), • Visual pollution (from dust and emissions), ▪ Soil waste spoiling Sources: • Oil/grease leaks from machineries, • Solid waste disposal (filters, greases, asphalt wastes, etc.), • Construction machinery, excavations and vehicles.	• Develop and document Standard Operating Procedures (SOPs), schedules and supervision guidelines for the project, • Identify sensitive environmental features (e.g. river/stream crossings) for necessary precautions, • Establish a programme of waste management and dust control throughout construction period.	The Contractor Resident Engineer	Approx 3,000,00.00 Including study for SOP and safety for accidental spill	Minimal disruption to physical and biological environmental quality throughout the route.	• Physical water quality, • Affected environmental features, • Environmental health risks, • Waste from construction and camp sites and their ultimate destinations Risks from camp sites, service yards and Hydro-carbon working yards.
6	Land degradation: • Soil loss, • Soil quality degradation, Source: • Channeling surface runoff away from natural drainage lines),	• Initiate a vegetation programme on canal route, • Draw rehabilitation plans of reflect this aspect.	The Contractor, The Resident Engineer	Approx 1,000,000.00 for scour checks etc	Conservation of soils on each side of the canal throughout	A project wide concern

Table 4c: Environmental Management Plan (Part 3)

Item No.	Anticipated Impacts and Sources	Proposed Actions	Responsibility and Timeframe	Costs	Targets to Achieve	Monitorable Indicators
7	Health and Safety • Personal injuries (construction employees), • Communicable diseases (workers and local communities), • Accidental falls into canal and intake • Environmental diseases (bronchial and eye problems), Sources: • Construction dust and emissions, • Social interaction of construction workers and the local communities, • Pollution of water from construction activities.	• Initiate a safety programme for all construction sites and working areas involving information, awareness and physical protection • Initiate awareness creation program among the workers and residents on HIV/AIDS and other infectious diseases, • Provide' medical, insurance cover and PPEs for all the construction workers.	The Contractor, The Resident Engineer To be initiated immediately and continue throughout the project period.	Approx 2,000,000.00 for HIV/AIDS training etc Health care and accidents under insurance cover of contractor	Information flow and dissemination on health and safety. Specific response to HIV/AIDS issues	Complaints on health safety aspects related to the road construction activities.
8	Social and Economic: • Temporary disruption of river flows • Public disaffection from the project implementation insensitivity, • Benefits to the riparian communities (employment, trade, etc.) Sources: • Coffer dams	• Enhance consultations with communities on activities affecting them and collaborate on the impacts reduction, • Establish modalities of recruiting manual labour from within the project area.	The Resident Engineer in conjunction with the Contractor, Liaison with local authorities and the Provincial Administration, Action within the project implementation period	Approx 300,000.00 for communication and dissemination	An acceptable, sustainable and economically viable road with long term benefits to the people without adverse implications on the physical and biological environment.	Trends in socio-economic dynamics within the area

8.0 Conclusion

On the basis of the assessment undertaken, there are no major environmental negative impacts and the project benefits overrides the anticipated environmental and social impacts. A comprehensive environmental and social management plan has provided a schedule of activities to achieve and guide these mitigation and legal measures
The detailed feasibility study for Gura MHP Project shows the project is economically and technically viable

APPENDICES

Appendix 1: Pictures of Gura Hydropower Site

Request for NEMA TOR Approval

KENYA TEA DEVELOPMENT AGENCY LTD.

KTDA

REGIONAL MANAGER
P.O BOX 646
OTHAYA
TEL:020-2022839

REGION II

Head Office
KTDA Farmers Building
P.O BOX 30213 Nairobi
Kenya
Telephone (+254 20)
3227000

YOUR REF:

OUR REF: REG/II/OFF/2

DATE: January 24th 2008

RECEIVED
14 FEB 2008
ENVIRONMENTAL IMPACT ASSESSMENT

The Director General
National Environment management Authority
P.O. Box 67839 – 00200
NAIROBI

Dear Sir,

RE: REQUEST FOR TOR APPROVAL

Gathuthi, Gitugi, Iriaini and Chinga Tea Factory companies Ltd are tea processing factories located in Nyeri District and managed by the Kenya Tea Development Agency (KTDA). The four factories are within Region II whose main office is next to Iriaini Tea Factory.

In view of rising energy costs the factories are desirous of developing a mini hydro power plant along the Gura River and accordingly a feasibility study will be carried out to determine the viability and costs therein. In addition an Environment Impact Assessment will need to be to be carried out and to this end we have prepared a TOR for the consultant, which is attached for your approval.

We look forward to hearing from you.

Yours faithfully,

[illegible] NIAGI
REGIONAL MANAGER
REGION II

S.M. Imanyara (Chairman) L.N Tiampati (Managing), J.M Mukavale, J. Nyagaruma, S.M.Kiarie, J.D.Kimura, J.A.Koge, C.Kirundi, S.N.Matonda, P.T.Kanyango, G.K.Rugo, P.Ngetich, M.F.Njeru, A.K.Kimberia (co)

NEMA TOR Approval (page 1)

Terms of Reference

ENVIRONMENTAL IMPACT ASSESSMENT STUDY OF GURA MINI HYDRO PROJECT.

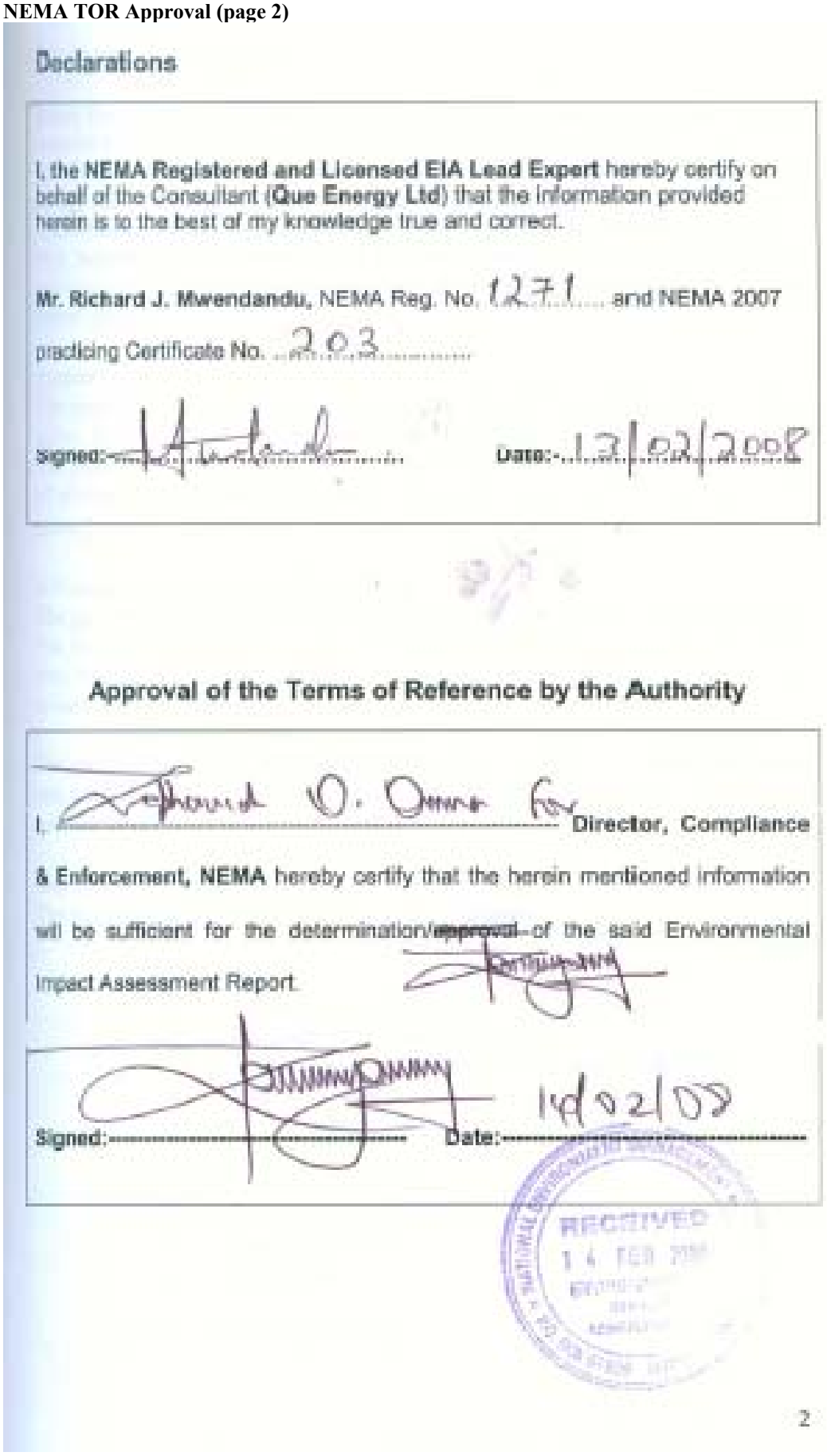
Prepared for approval by:

NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY
(NEMA)
Kapiti Road
P.O. Box 67839 00200
NAIROBI

On Behalf of:

Kenya Tea Development Authority (KTDA)
Region II
Regional Manager
P.O. Box 646
Othaya.

NEMA TOR Approval (page 2)



Declarations

I, the **NEMA Registered and Licensed EIA Lead Expert** hereby certify on behalf of the Consultant (**Que Energy Ltd**) that the information provided herein is to the best of my knowledge true and correct.

Mr. Richard J. Mwendandu, NEMA Reg. No. 1271 and NEMA 2007 practicing Certificate No. 203

Signed:..... Date:-13/02/2008

Approval of the Terms of Reference by the Authority

I, ... for **Director, Compliance & Enforcement, NEMA** hereby certify that the herein mentioned information will be sufficient for the determination/~~approval~~ of the said Environmental Impact Assessment Report.

Signed:..... Date:- 14/02/08

RECEIVED 14 FEB 2008

2

NEMA TOR Approval (page 3)

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

Tel: +254 20 6005722/3/6/7, 600945
Wireless: +254 20 2081130
Mobile: 0724 253398, 0733 600035
Fax: +254 20 600997
E-mail: dgnema@nema.go.ke

Popo Road, off Mombasa Road
P.O. Box 67839 - 00200
Nairobi, Kenya
Website: www.nema.go.ke

NEMA/EIA/5/2/..... Date 14.02.2008

REGIONAL MANAGER
REGION II
KENYA TEA DEVELOPMENT AGENCY LTD
P.O.BOX 646
OTHAYA

RECEIVED
14 FEB 2008
ENVIRONMENTAL IMPACT ASSESSMENT

RE: ACKNOWLEDGEMENT AND APPROVAL OF TERMS OF REFERENCE (TOR) FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

We acknowledge the receipt of the TOR for the above subject.

Pursuant to the Environmental Management and Coordination Act, 1999 the second schedule and the Environmental (Impact Assessment and Audit) Regulations 31 and 35, your terms of reference for the Environmental Impact Assessment (EIA) for the proposed.....GURA MINI HYDRO PROJECT.....
..... have been approved.

You shall submit ten (10) copies and one (1) electronic copy of your report prepared by a registered expert to the Authority. EIA licence fee (0.1% of the total project cost) shall be paid to the National Environment Management Authority (NEMA) on submission of the report.

B. M. LANGWEN
For: DIRECTOR GENERAL

Our Environment Our Life

Appendix 2: Pictures of Gura Hydropower Site

Plate 1: Typical Forest Cover which will be affected by channel

Plate 2: Intake location

Plate 3a: Typical Farming Activities- Tea growing and dairy farming

Plate 3b: Typical Farming Activities- Tea growing and dairy farming

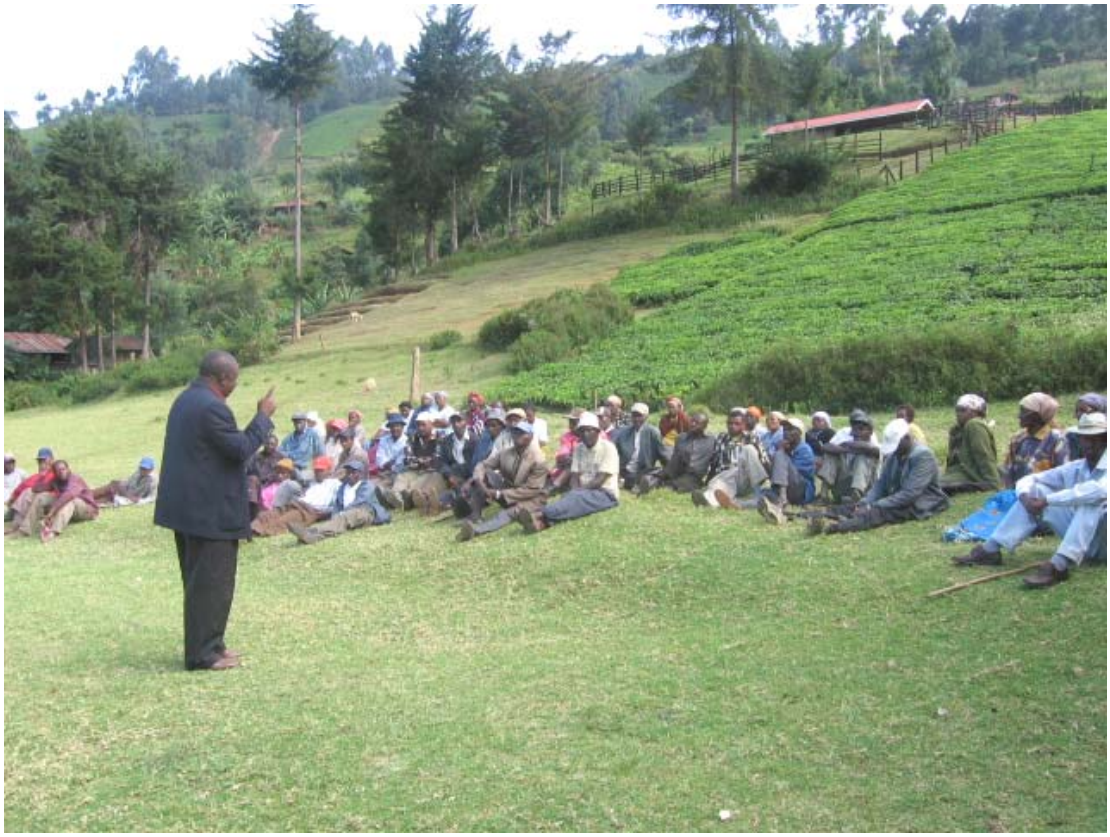
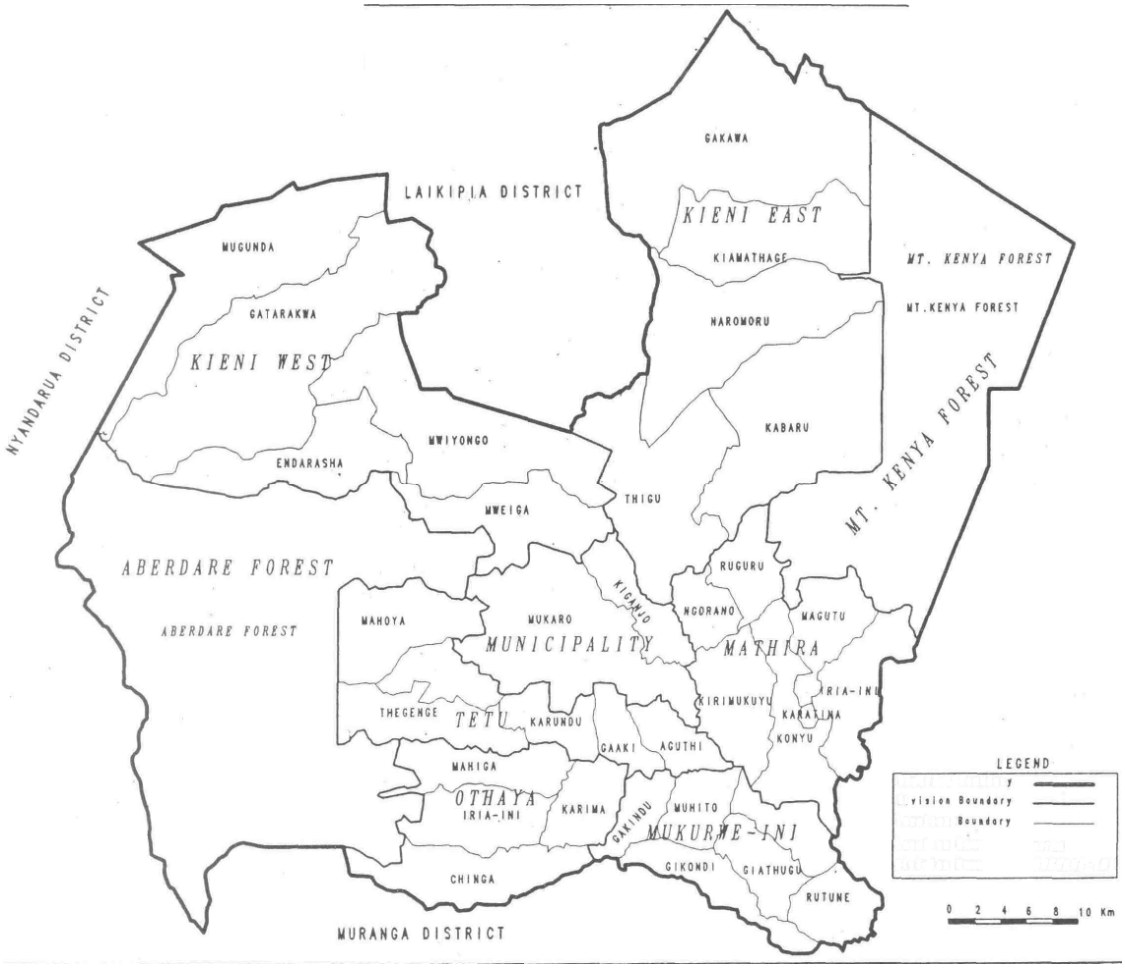


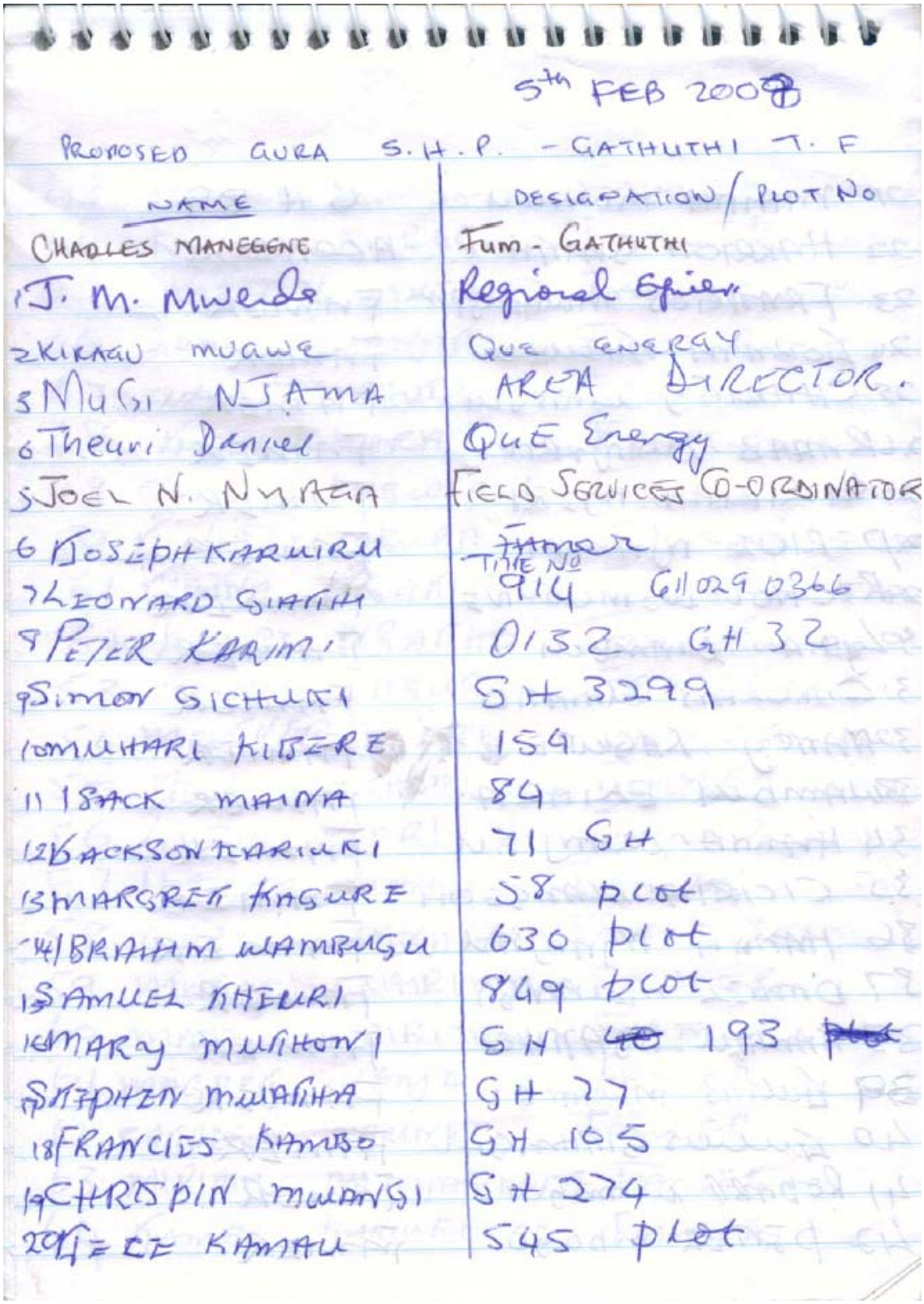
Plate 4: Mr D Theuri of Que Energy addressing the farmers

Plate 5: Mr Mugi Njama; Area Director, Gathuthi Tea Factory addressing the farmers

Appendix 3: Nyeri Administrative Boundaries



Appendix 4: Attendance List at Consultative Meeting

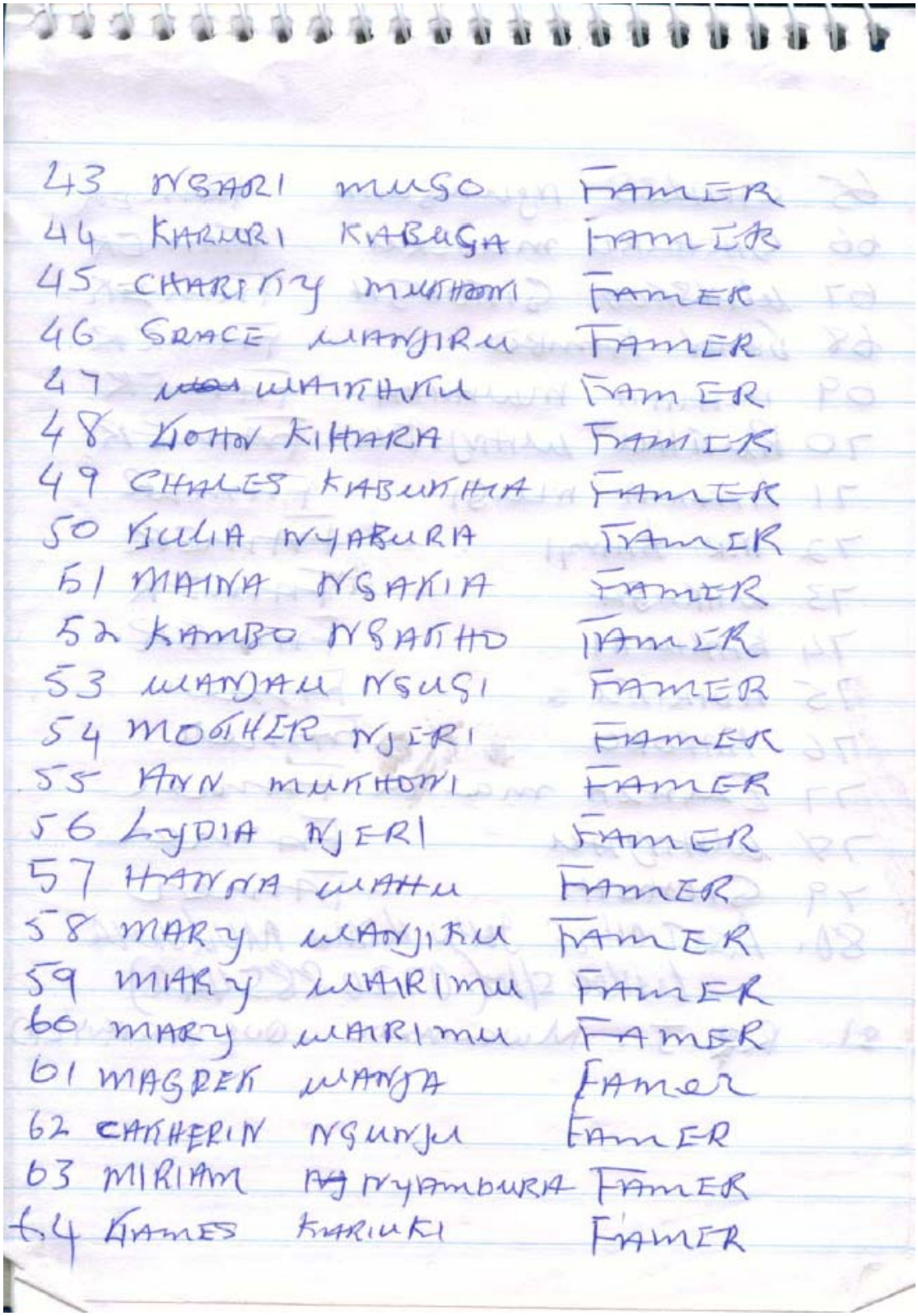


5th FEB 2008

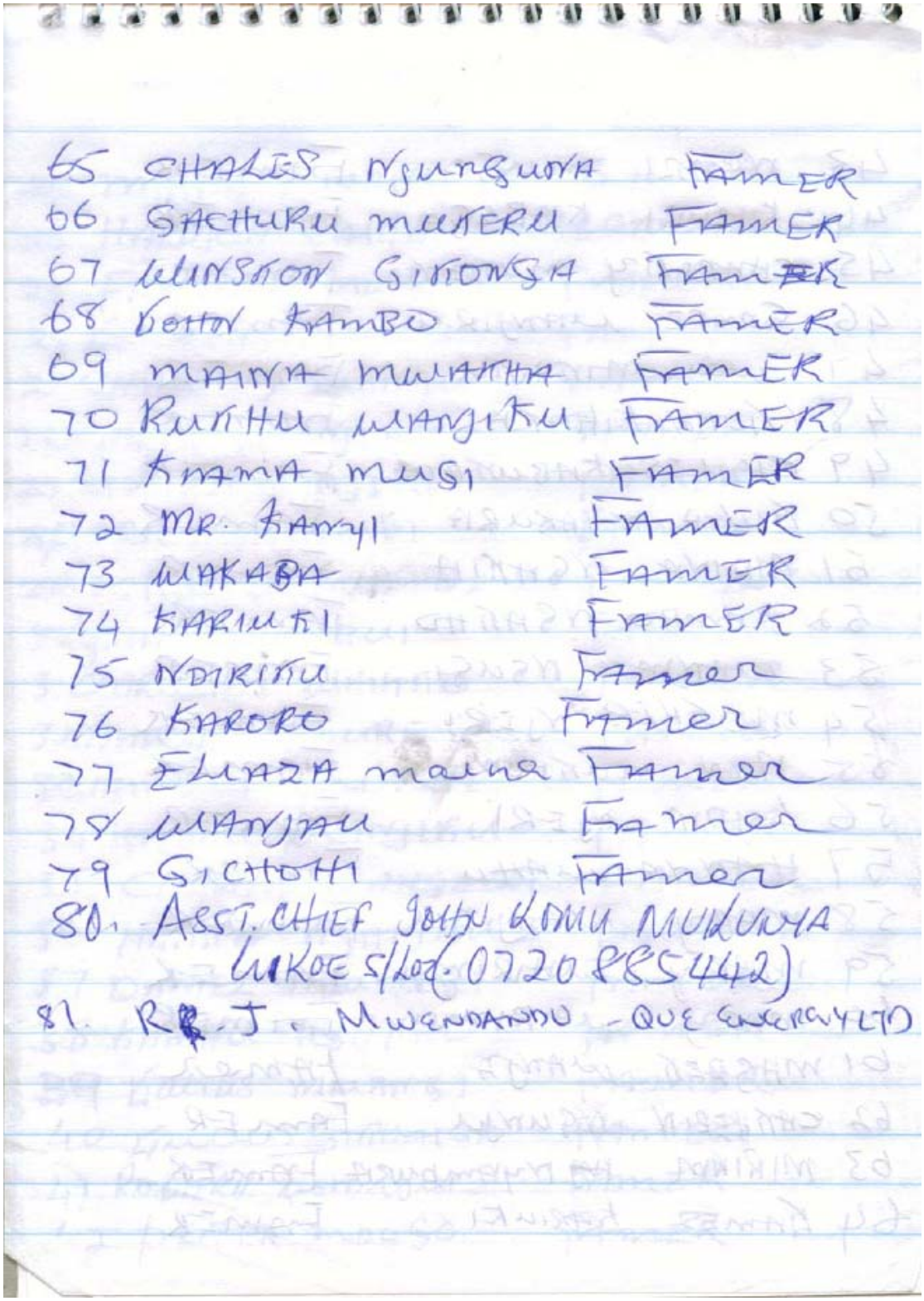
PROPOSED GURA S.H.P. - GATHUTHI T.F

NAME	DESIGNATION / PLOT NO
CHARLES MANEGGNE	Fum - GATHUTHI
1 J. M. Mwenda	Regional Epier.
2 KIRAGU MUAWE	QUE ENERGY
3 MUGI NJAMA	AREA DIRECTOR.
6 Theuri Daniel	QUE Energy
5 JOEL N. NYAGA	FIELD SERVICES CO-ORDINATOR
6 JOSEPH KARUIRU	FARMER TITLE NO
7 LEONARD GIATHI	914 G11029 0366
8 PETER KARIMI	0132 GH 32
9 SIMON GICHUKI	SH 3299
10 MUHARI KIBERE	154
11 ISAAC MAINA	84
12 JACKSON KARIUKI	71 GH
13 MARGRET KAGURE	58 plot
14 IBRAHIM WAMBUGU	630 plot
15 SAMUEL THEURI	849 plot
16 MARY MURIHONI	GH ~~40~~ 193 ~~Plot~~
17 STEPHEN MWAFIHA	GH 27
18 FRANCIES KAMBO	GH 105
19 CHRISPIN MWANGI	SH 274
20 ~~ZE~~ KAMAU	545 plot

21	MAINA MWANU	GH 39
22	HARRISON GAINA	Atendant
23	FRANCIES MWANGI	FAMER
24	NORAM NHEURU	FAMER
25	CHARITY WANGUI	FAMER
26	RAHAB WANJIRA	FAMER
27	LIRIAN NJIRI	FAMER
28	PERICE NJAMBI	FAMER
29	RECHOL W. MUKUNE	FAMER
30	LYDIA WAMBUI	FAMER
31	CAROLAN WAHNO	FAMER
32	NANCY KAGURE	FAMER
33	WAMBUI ELIAZA	FAMER
34	HANNA WANJIRU	FAMER
35	CICIRIA WANGECH	FAMER
36	HANNA NJANJAU	FAMER
37	DANIEL MWANGI	FAMER
38	KAMAU NGATHO	FAMER
39	JULIUS MWANGI	FAMER
40	JULIUS GITHAIGA	FAMER
41	RODARD WAMBUI	FAMER
42	PETER MBOGO	FAMER



43 NGARI MUGO FARMER
44 KARURI KABUGA FARMER
45 CHARITY MUTHONI FARMER
46 GRACE WANJIRU FARMER
47 ~~WAN~~ WAITHAKU FARMER
48 ~~JOHN~~ KIHARA FARMER
49 CHALES KABUTHIA FARMER
50 JULIA NYABURIA FARMER
51 MAINA NGAKIA FARMER
52 KAMBO NGATHO FARMER
53 WANJAU NGUGI FARMER
54 MOSES NJERI FARMER
55 ANN MUTHONI FARMER
56 LYDIA NJERI FARMER
57 HANNA WATHU FARMER
58 MARY WANJIRU FARMER
59 MARY WAIRIMU FARMER
60 MARY WAIRIMU FARMER
61 MAGRET WANJA FARMER
62 CATHERIN NGUNJU FARMER
63 MIRIAM ~~AG~~ NYAMBURA FARMER
64 JAMES KARIUKI FARMER



65 CHARLES NJUNGUYA FARMER
66 GACHURU MUTERU FARMER
67 WILLSTON GITONGA FARMER
68 VICTOR KAMBO FARMER
69 MAINA MURATHA FARMER
70 RUTHU MWANGIKU FARMER
71 KIAMA MUGI FARMER
72 MR. KAMYU FARMER
73 MAKABA FARMER
74 KARIUKI FARMER
75 NDIRITU Farmer
76 KARORO Farmer
77 ELIAZA maina Farmer
78 MWANJAU Farmer
79 GICHOHI Farmer
80. ASST. CHIEF JOHN KOMU MUKUNYA (MKOE S/Loc. 0720 885442)
81. R.J. MWENDANDU - QUE ENERGY LTD

Appendix 5: Social Survey Template

Typical social survey template

KTDA: GATHUTHI TEA FACTORY - PROPOSED GURA MHP

1. Name _____
2. LR/Plot No _____
3. Topography _____
4. Soils _____
5. Flora and fauna _____
6. Land Use _____
7. Service utilities and other infrastructure _____

_____

8. Remarks /Other significant features _____

_____

Comments on social issues

9. HIV / AIDS and other communicable diseases _____

_____

10. Noise _____

_____

11. Cultural tension _____

_____

12. Temporary employment _____

_____

13. Income generation activities _____

_____

14. Soil erosion _____

_____

15. Disruption of community access and livestock routes _____

_____

16. Construction related diseases _____

_____

17. Any Objections to the construction of the project _____

18. Any Other comments _____

_____

_____

Example of filled social survey template

KTDA; GATHUTHI TEA FACTORY - PROPOSED GURA MHP

1. Name Mary wathoni ngatia
2. LR/Plot No 691
3. Topography Slopy
4. Soils Red
5. Flora and fauna Tea bushes
6. Land Use farming
7. Service utilities and other infrastructure NO
8. Remarks /Other significant features NO

Comments on social issues

9. HIV / AIDS and other communicable diseases workers to be of good health and discipline
10. Noise Normal
11. Cultural tension NO
12. Temporary employment Yes
13. Income generation activities compensate with cash
14. Soil erosion NO
15. Disruption of community access and livestock routes Lower on top / make walk-over
16. Construction related diseases NO
17. Any Objections to the construction of the project NO
18. Any Other comments Tell makes for a meeting

Appendix 6: Water Abstraction Request

WATER RESOURCES MANAGEMENT AUTHORITY
TANA CATCHMENT AREA

Tel: 060-31446
Tele/Fax
Email:

UPPER TANA SUB-REGIONAL OFFICE
P. O. BOX 304 - 10200
MURANG'A

Ref. No: WRMA/3/1/74

13th February 2008

The Regional Manager,
Kenya Tea Development Agency Ltd,
P. O. Box 646,
OTHAYA.

RE: REQUEST FOR WATER ABSTRACTION

Reference is made to your letter Ref. No. REG/11/of/2 dated 30th January 2008.

The requirements for the application for water abstraction are as hereunder: -

1. Cadastral maps showing the location for the factories and points of intakes for the water works.
2. Two topographical map sheets 134/2 showing the point of intake.
3. Title deeds for the plots where the water works will be constructed.
4. Certificates of Incorporation.
5. Letters of no objection from owners of the plots in (3) above if the plots are not owned by the applicants themselves.
6. The feasibility study report.
7. Application fee of Kshs.42,000.00.
8. A letter of no objection from Kenya Forest Service for entering the forest.

F. N. GACHUGA
SUB-REGIONAL MANAGER
UPPER TANA SUB-REGION - MURANG'A

Accounting for every drop!

Appendix 7: Nyeri District Fact Sheet

1.2 DISTRICT FACT SHEET

The District Fact Sheet presents a broad range of information about the district at a glance. It captures factual information like the district area, topography, climate, demographic and population profiles, socio-economic indicators as well as data on agriculture, education, health, energy, transport and communication among others.

Area		
Total Area		3,266 km^2
Arable land		2,349 km^2
Non Arable land		108 km^2
Gazetted forest		641.1 km^2
Urban area (Nyeri Municipal)		167.9 km^2
Topography and Climate		
Altitude:	Highest	5,199m
	Lowest	3,076m
Rainfall:	Wambugu Farm	900mm
	Iria-ini	1,000mm
	Kagochi	1,200mm
Rainfall by seasons (Long and short rains)		
Average annual rainfall		500mm – 2,400
Short rains		900mm
Long rains		1,500mm
Temperature range		
Months with highest temperatures (January)		29^{0}C
Months with the lowest temperatures (July)		9^{0}C
Temperature average		16.8 ° c
Demographic and Population Profiles (2002)		
Population size		677,216
Population structure:		
Total no. of males		330,355
Total no. of females		346,861
Female/male sex ratio		105:100
Total no. of youthful population (15-25 years)		158,741
Total population of primary school going age (6-13 years)		139,502
Total population of secondary school going age (14-17 years)		82,497
Total labour force (15-64 years)		381,960
Dependency ratio		100:77
Population growth rate		0.8%
Density		
Highest density (Municipality Division)		610 persons/ km^2
Lowest density (Kieni West Division)		112 persons/km^2
Average density		202 persons/ km^2
Rural Population		
Rural population: Rural population 2002		499,152
Rural population 2008		520,620
Urban population		
Number of towns with a population of 2,000 – 10,000		4
Urban population at the start of the plan period		
Nyeri		103,697
Karatina		48,211
Othaya		20,451
Naro Moru		2,930
Total		175,289
Crude birth rate		29/1,000
Crude death rate		8/1,000
Life expectancy: Average		46 years
Females		48 years
Males		44 years
Immunization coverage		88%
Infant mortality rate		27/1,000
Under 5 mortality rate		34/1,000

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Total fertility rate		2.54		
Socio-Economic Indicators				
Total number households		168,786		
Average household size		4 persons		
Number of female headed households		56,000		
Number of children headed households		3,000		
Number of disabled	Female	800		
	Male	1,200		
Children needing special protection		9,000		
Absolute poverty (rural and urban)		31%		
Number living below absolute poverty line		206,700		
Contribution to national poverty		Less than 1%		
Average household incomes: Sectoral contribution to household income				
Agriculture		53%		
Rural self employment		10%		
Wage employment		20%		
Urban self employment		2%		
Other		1%		
Number of unemployed		40%		
Agriculture				
Average farm size (small scale)		0.6 ha		
Average farm size (large scale)		4.0 ha		
Main food crops produced		Maize, beans, Irish potatoes, bananas and cabbages		
Main cash crops produced		Coffee, tea, and horticultural crops		
Total acreage under food crops		38,363 ha		
Total acreage under cash crops		27,870 ha		
Main storage facilities (on and off farm)		On farm barns		
Population working in the agriculture sector		360,000		
Total no. ranches		1		
Average size of ranches		4000 ha		
Main livestock breeds:				
	Cattle	Fresian, Aryshires and crosses		
	Goats	Alphine, small East African goat		
	Sheep	Hampshire, indigenous		
	Pigs	Landrace, large white		
	Poultry	Hybrid layers and broilers, indigenous		
Land carrying capacity:	Kieni East/West	1 L.U in 3 acres		
	Other divisions	1 L.U in 1.5 acres		
Population working in the livestock sector		360,000		
Main species of fish catch		Tilapia, catfish, common carp and trout		
Population of fish farmers		494		
No. of fish ponds		710		
Size of gazetted forest		115,199.04 ha		
Size of non-gazetted forests		4,000 ha		
Main forest products		Timber, fencing poles and firewood		
% of people engaged in forest related activities (saw mills, furniture works etc)		10%		
Cooperatives				
Number of active cooperatives by type (i.e. SACCOs, agriculture coops, unions, housing etc)				
		No	**Membership**	**Turnover**
Producer		65	96,803	Ksh 4 billion
Transport		6	282	Kshs. 150m
Housing		5	10,220	Kshs 70m
Urban		25	9,448	Kshs 50m
Rural		2	34,309	Kshs 5m
Investment		1	3,797	Kshs 10m
Total		**105**	**154,859**	**4,285 billion**
Key coops which have collapsed in the last 5 years		Coffee and dairy		
Total registered members		154,859		

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Literacy levels by sex Female Male	 82% 96%
Health	
Three most prevalent diseases	Pneumonia, heart disease, cancer, malaria
Doctor/patient ratio	1:29,000
Number of hospitals	3
Number of health centres	15
Number of dispensaries	67
Nursing homes	12
Health clinics	15
Total bed capacity	1,560
Total bed occupancy (per annum)	64,000
Average distance to nearest health centre:	6 kms
Percentage households with access to health facility	65.8%
Energy	
Number of households with electricity connections	11,053
Number of trading centres with electricity	74
% rural households using solar power	0.4%
% households using firewood/charcoal	80%
% households using kerosene, gas, or biogas	90%
Transport Facilities	
Total kilometres of roads (i.e. earth, murram, (RAR) bitumen)	
Classified roads	1,715.5 kms
Rural access roads	1,258.5 kms
Total length of railway line and number of stations	78 kms; 3 stations (non-functional)
Number of airports/airstrips	3
Number of waterways	Nil
Number of public service vehicles	625
Communication	
Number of households with telephone connections	2,705
Number of private and public organizations with telephone connections.	2,415
Mobile service coverage	98%
Number of post/sub-post offices	20
Number of telephone booths	330
Number of households without radios	16,000
Number of cyber cafe s	1
Trade and Commerce and Tourism	
Number of trading centres	235
Number of hotels	205
Number of tourist class hotels	6
Main tourist attractions	Aberdares and Mt. Kenya, National Parks
Number of registered hotels/kiosks	205
Number of licensed businesses	3,149
Total Number of informal sector enterprises	4,649
Banks and Financial Institutions	
Number of banks	10
Development financial institutions (DFIs)	2

Water and Sanitation		
Number of households with access to piped water		123,404
Number of households with access to potable water		92,878
Number of permanent rivers		49
Number of wells		139
Number of protected springs		5
Number of boreholes		69
Number of pans/dams		81
Number of households with roof catchmentss		153,020
Average distance to nearest portable water point		1.5 kms
Number of VIP latrines		72,949
Education		
Pre-Primary School		
Number of pre-primary schools		567
Total enrolment rates (boys and girls)	Boys	98%
	Girls	96%
Total drop out rates:	Boys	6%
	Girls	9%
Teacher/pupil ratio		1:24
Average years of school attendance		2 years
Primary School		
Number of primary schools		458
Total enrolment rates by sex:	Boys	89%
	Girls	86%
Total drop out rate i by sex:	Boys	6.5%
	Girls	8.3%
Teacher/pupil ratio	Public schools	1:40
	Private schools	1:25
Average years of school attendance by sex	Boys	8
	Girls	7
Secondary school		
Number of secondary schools		136
Total enrolment rate:	Males	75%
	Females	68%
Total drop out rates:	Males	12%
	Females	16%
Teacher/pupil ratio		1:40
Average years of school attendance		3
Tertiary		
Number of other training institutions (e.g. colleges, polytechnics etc)		3
Main type of training institutions		Teacher training, primary and secondary school and technical college
Adult Literacy		
Number of adult literacy classes		12
Enrolment by sex:	Males	118
	Females	133
Drop out rates by sex:	Males	3%
	Females	1%

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