
**ANNUAL ENVIRONMENTAL REPORT FOR ASUBIMA AND
AFRENSU-BROHUMA FOREST RESERVES NEAR AKUMADAN
IN THE OFFINSO NORTH DISTRICT OF ASHANTI REGION**



Prepared by: **FORM Ghana Limited**

Submitted to: **Environmental Protection Agency (EPA), Ghana**

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*This is an Annual Environmental Report for Asubima and Afrensu-Brohuma Forest Reserves near
Akumadan in the Offinso North District of Ashanti Region, Ghana*

Prepared by: **FORM Ghana Limited**
P.O Box SYI 211,
Sunyani, Bono Region
Ghana

Authors: *Paul Ontoaneyin* *Environment and Social Manager*
Kizito Doghle *Environment and Social Officer*
Bismark Adjei Manu *Environment and Social Officer*
Evelyn Affreh *Environment and Social Officer*

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INTRODUCTION

FORM Ghana Limited is a reforestation company established in 2007 with the aim of large-scale reforestation of degraded forest reserves in Ghana, while conserving and restoring natural, riparian forest. FORM Ghana has established plantations within the Asubima & Afrensu-Brohuma Forest Reserves at Akumadan in the Offinso North District of Ashanti Region and the Tain II Forest Reserve in the Berekum Municipality of the Bono Region.

In line with Ghana's environmental requirements for new undertakings of specified scales as contained in the Environmental Assessment Regulations 1999 (LI 1652), FORM Ghana conducted independent environmental impact assessments on the degraded reserves that were acquired for the plantation establishment. The Environmental Protection Agency operating under the legal mandate of Environmental Protection Agency Act, 1994 (Act 490) granted FORM Ghana a permit (CF: 62/LG/FO/02) to carry out its operations.

As part of the conditions for the grant of permit, FORM Ghana is expected to annually update the Agency on the status of its operations and the environment. This Annual Environmental Report thus seeks to meet this requirement. The report specifically presents environmental and production details of the year 2020 in FORM Ghana's Asubima and Afrensu-Brohuma Forest reserves near Akumadan. The report is structured according to the specific requirements by EPA as outlined in the Annual Environmental Report (Form AER1) for Forest and Wood Sector Projects.

1.0 COMPANY PROFILE

	Information Required	Information Provided
1.1	Name of Company	FORM Ghana Limited
1.2	Type of Undertaking	Reforestation / Forest Plantation Management
1.3	Year of establishment of Project	2007
1.4	Location (Town/District/Region)	Akumadan / Offinso North/ Ashanti Region
1.5	Contact Person Position Tel. No. Email	Mr. Willem A. Fourie Managing Director +233 544441440 w.fourie@formghana.org
1.6	Address of Correspondence	P.O Box SYI 211, Sunyani - Ghana

1.7 Permits/Licenses and Certificates obtained

S/N	Institution	Permit		Permit No/License No/Date of Issue/Expiry
		Yes	No	
1	Environmental Protection Agency	X		CF: 62/LG/FO/02 15/08/2018 – 14/08/2021
2	Water Resources Commission	X		FGLID 421/18 01/01/2019 – 31/12/2021
3	Forestry Service Division		X	
4	Wildlife Division		X	
5	Others	X		
	Ghana National Fire Service Certificate	X		AK-489-6001/ (under renewal)
	Forest Stewardship Council	X		CU-FM/COC-811445 / FSC-C044035 19/01/2020 – 18/01/2025

1.8 Workforce Category

Table 1.1: FORM Ghana Workforce as at December 2020

Division	General Workers			Management Workers			Total
	Male	Female	Total	Male	Female	Total	
Sunyani (HQ)	4	2	6	8	2	10	16
Akumadan P	120	48	168	11	1	12	180
Akumadan C	83	82	165	1	1	2	167
Allanblakia P	1	0	1	1	0	1	2
Allanblakia C	2	0	2	0	0	0	2
Berekum P	177	43	220	22	6	28	248
Berekum C	223	72	295	0	0	0	295
Palladium P	0	1	1	2	1	3	4
Grand Total	610	248	858	45	11	56	914
Percentage (%)	71.09	28.9	100.00	80.35	19.64	100.00	
Permanent Staff (P)- 450							
Casual Staff (C)- 464							

2.0 SITE DESCRIPTION

2.1 Location and Major landmarks

The Asubima and Afrensu-Brohuma Forest Reserves are found in the northern tip of the Ashanti Region, of the Offinso North District. The Reserves form a contiguous block of forest reserve. Major landmarks within the south-western section of the reserves are the Ghana Irrigation and Development Authority facility and Agritop’s Green House facility in Akumadan. The nearest towns are Akumadan and Techiman.

2.2 Geographical Coordinates of vertices of the concession to define land area

The plantations are located within the Asubima and Afrensu-Brohuma Forest Reserves in Offinso North District near Akumadan, in the Ashanti Region. Coordinates (WGS 84 - UTM) for the reserves are:

<i>Point</i>	<i>X-coordinate</i>	<i>Y-coordinate</i>
1	630.857,53	813.998,60
2	628.112,11	822.930,15
3	620.644,40	820.840,93
4	624.388,38	817.874,20
5	622.666,10	815.162,44

2.3 Total Land Take of concession

The total land take for the Asubima and Afrensu-Brohuma forest reserves is 3,447.4 hectares GIS area.

2.4 Actual area forested

The actual area forested by FORM Ghana in the Asubima and Afrensu-Brohuma forest reserves is 3416 hectares. Details of actual forested area are shown in the table below:

RESERVE	LEASE AREA (ha)	YEAR (ha)	TOTAL AREA (ha)	INDIGENOUS (ha)	TEAK (ha)	UNPRODUCTIVE (ha)	AREA PER RESERVE (ha)
Asubima	1776.5	2001	66.1	11.6	53.8	0.8	1,667.5
		2006	107.5	15.0	91.4	1.0	
		2008	171.5	22.4	148.2	1.0	
		2009	609.0	92.3	512.6	4.2	
		2010	713.4	88.5	612.5	12.4	
Afrensu-Brohuma	1778.1	2011	986.4	132.8	844.3	9.3	1779.9
		2012	793.5	127.8	663.1	2.6	

2.5 Area under conservation

Area under conservation	521 hectares
Type of Conservation: Strict	0
Type of Conservation: Partial	521 hectares
List some species found:	Species monitoring within the plantation conservation areas is undertaken within every 5-year interval. From the last survey in 2015 & 2018, the following floral, mammal and avifauna species were identified.
Flora:	<i>Azelia africana</i> , <i>Albizia ferruginea</i> , <i>Antiaris toxicaria</i> , <i>Ceiba pentandra</i> , <i>Hildegardia barteri</i> , <i>Erythrophleum ivorense</i> , <i>Khaya anthoteca</i> , <i>Khaya grandifoliola</i> , <i>Milicia excelsa</i> , <i>Triplochiton scleroxylon</i> , <i>Terminalia superba</i> .
Mammals:	The most frequently observed species were <i>Praomys tullbergi</i> and <i>Crocidura crossei</i> . <i>Lemniscomys striatus</i> and <i>Crocidura juvenetae</i> were the least observed species, with only one sighting of each species. Large quantities of the straw-coloured fruit bat (<i>Eidolon helvum</i>) can be observed flying over the plantation area at dusk. In daytime, bats rest on trees at the plantation site.
Avifauna:	The moustached grass warbler was the most frequently recorded species. This is likely to be the result of the abundance of grasses in the area, providing suitable habitat for the moustached grass warbler and other weaver species.

2.6 River(s) / Stream(s) traversing or within 100 m of the Concession

The Asuasu (Bebui)/Asubima stream with various affluent flow through the Asubima Forest Reserve. Also, various branches of the Brohuma stream are found in Afrensu-Brohuma Forest Reserve.

2.6.1 What is the buffer distance maintained between the concession and rivers?

The buffer distance between the teak plantation and the streams, which have about 4-5m wide stream beds is thirty meters (30m).

2.7 Approximate distance of River(s) to nearest settlement to the concession

Kumu village is some 500metres away from the plantation and some 200metres from the Asuasu (Bebui) stream. Nkubem is on the border of the plantation and also on the side of an affluent of the Brohuma stream. Other villages are more than a kilometre away or not bordering any stream.

2.8 Adjacent land Uses

<i>North</i>	Teak plantation
<i>South</i>	Degraded forest Reserve/agriculture /teak plantations
<i>East</i>	Agriculture
<i>West</i>	Agriculture

2.9 List of ancillary facilities on site

FORM Ghana has a nursery which is not part of the forest reserves. It is about 3kilometres away from the nearest point of Asubima Forest Reserve. At the nursery the following facilities exist: 2staff houses, 1guesthouse, 2office blocks, 1workshop, 1training centre, 1canteen, 1store, 1fuel station, 3greenhouses, 1sanitary block, 4lockable sea containers (for storage), 1kindergarten, 1security guard house, 1water pump house, 4shade sheds with irrigation, 6hectares of irrigated terrain, 1fence. On the boundaries of the plantations there are guard shelters, and 4fire towers inside the plantation.

2.10 Distance between the concession and the nearest town /village

The nearest major town to the Plantation is Akumadan which is about 5kilometres. Surrounding settlements/villages such as Esereso/Konkomba and Atrensu are within a distance of 1kilometre to the plantation.

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

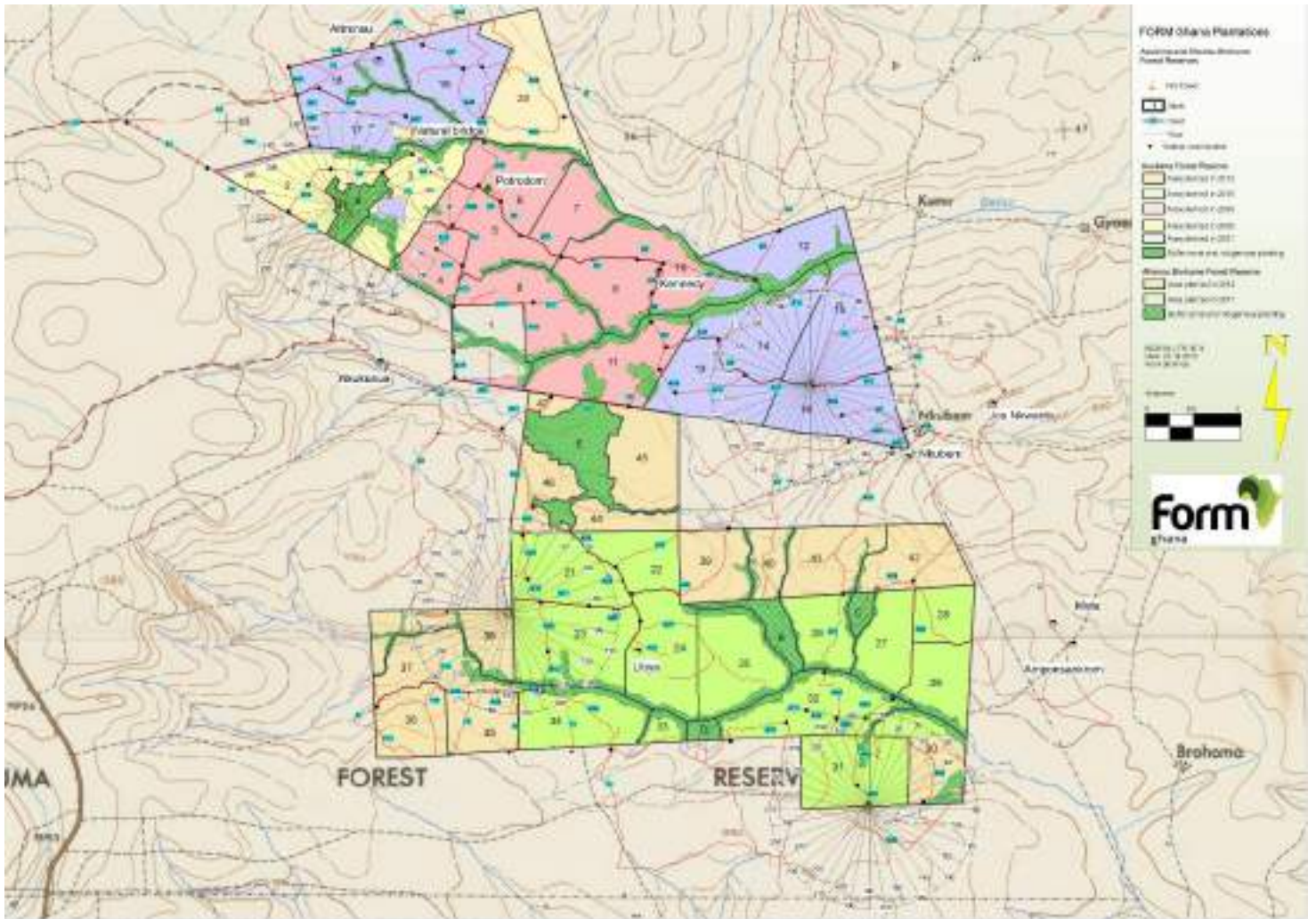


Figure 1.1: Detailed Map of Asubima and Afrensu-Brohuma Plantations in Akumadan

3.0 COMPANY OPERATIONS

3.1 Type of Forestry Development

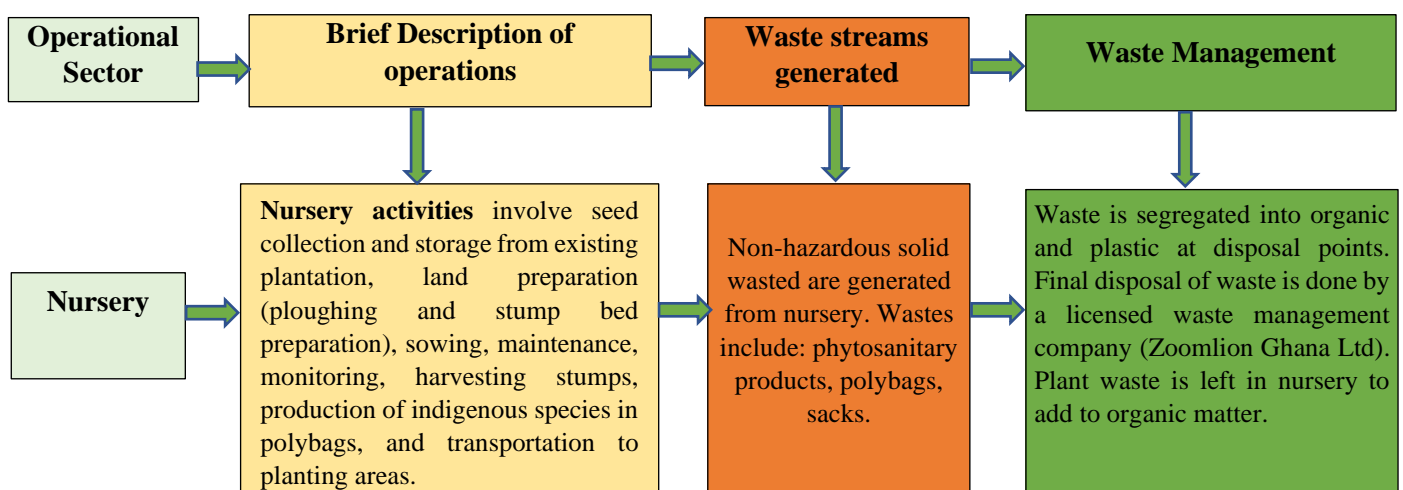
- 1) **Production Management:** FORM Ghana carries out production of teak and various indigenous seedlings in its nursery facility.
- 2) **Plantation:** FORM Ghana’s has a plantation within the Asubima and Afrensu-Brohuma Forest Reserves.

3.2 Section for forest establishment

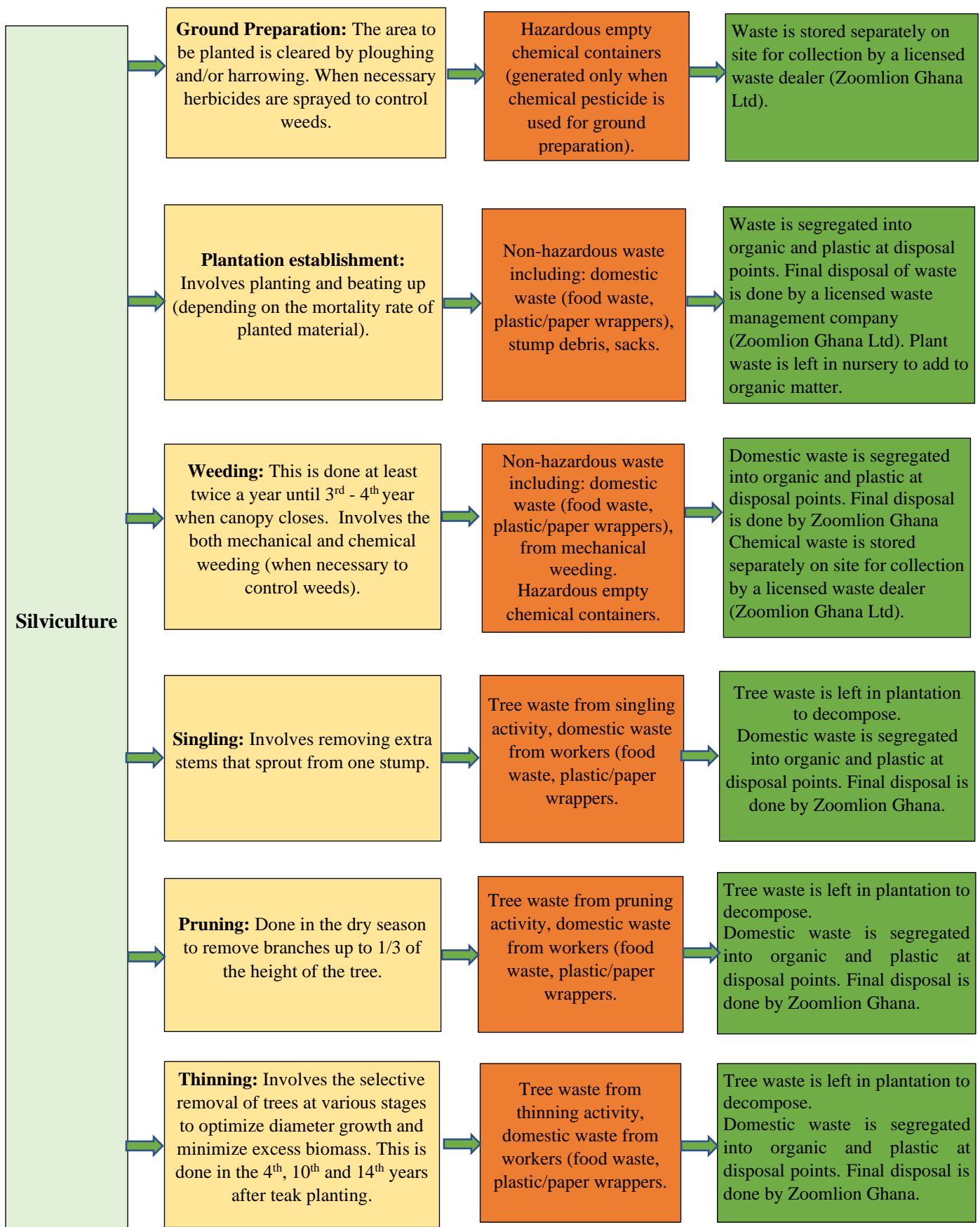
3.2.1 Production Details: Planting Material Information

<i>Species cultivated/Planted</i>	<i>Source</i>	<i>Area (Ha)</i>	<i>% of Planted Area</i>
Teak	Own nursery	3447,34	86%
Indigenous: <i>Ofram, Awiem-fosamina, Kokrodua, Potrodom, Onyina, Emeri, Watapuo</i>	Own Nursery	490,24	14%
*The last planting for the Asubima and Afrensu-Brohuma was done in 2012			
b) Expected Products from the development		Teak billets/saw logs	
		Teak poles	
		Carbon Credits	

3.2.2 Brief description of operations—from nursery to harvesting (attach an environmentally based process flow chart, indicating waste streams) and how waste is managed.



2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves



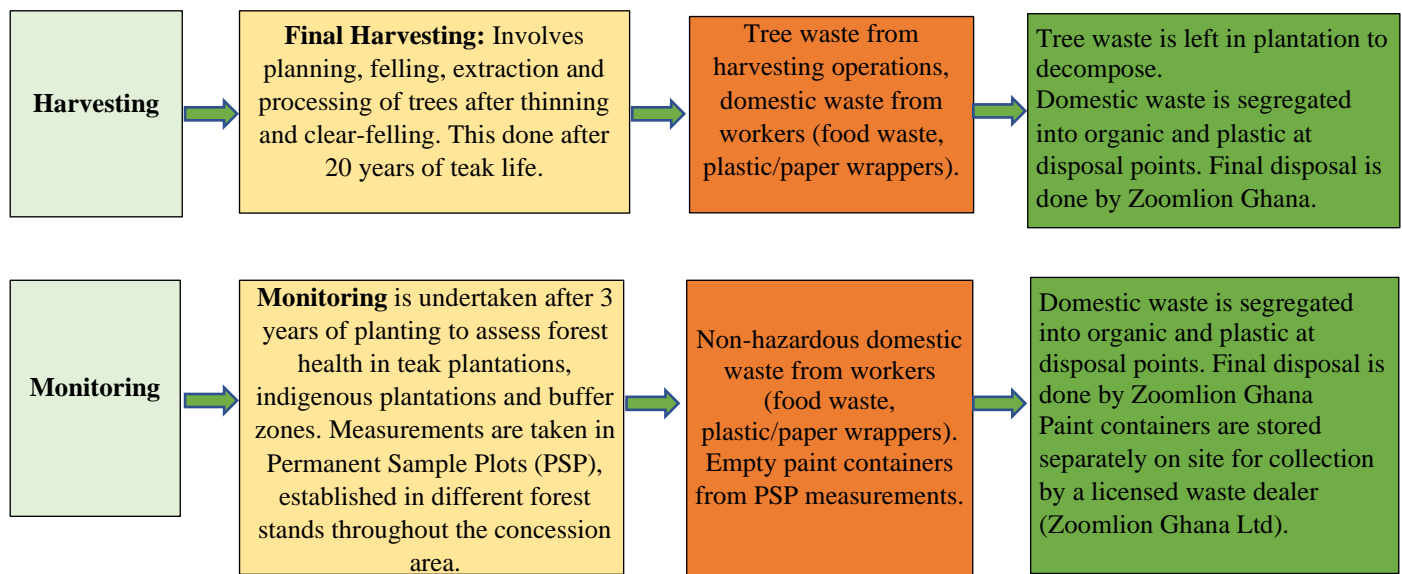


Figure 1.2: An environmental-based flow chart of FORM Ghana’s operations from nursery to harvesting

3.2.3 Type, source, quantities and mode of application of chemicals (herbicides/weedicides)

Table 1.2: Type, source, quantities and mode of application of chemicals by FORM Ghana in 2020

Type	Source	Quantity used	Mode of Application
Glyphosate (Kalach/Sunphosate/ Glyphader)	Dizengoff, Accra	1747 kg	Manual Foliar application
<p><i>This chemical product used is a weedicide. FORM Ghana uses FSC approved chemical pesticides as contained in the FSC Lists of highly hazardous pesticides (FSC-POL-30-001a EN, updated 1st May 2019).</i></p>			

**MSDS for chemical attached in Appendix*

3.2.4 What area of your land has been planted for the year under review?

No area has been planted for the year 2020. The planting in the Akumadan plantations ended in 2012.

3.2.5 Briefly describe harvesting and postharvest operations

All harvesting operations are preceded by pre-harvest planning which considers all the actions needed to be completed for the harvesting operation to take place. Such actions include road network inspection, preharvest weeding, marking for thinning, marking for poles, designing a harvest map, block information and risk assessment. General safety measures are put in place before actual felling of trees using chainsaws in designated plots.

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After harvesting, extraction, stacking and transportation, postharvest operations are undertaken to cover all aspects of the operation under environmental, social and economic aspects. A postharvest checklist is provided for undertaking postharvest assessment. In 2020, only limited thinning activities were undertaken between January and February.

3.3 Section for the extractive sector/Production Forest

S/N	Information Required	Information Provided
3.3.1	Type/name of forest	Asubima and Afrensu-Brohuma Forest Reserves / Teak plantation
3.3.2	Type of forestry product collected/harvested.	Teak billets/saw logs, Teak Poles
3.3.3	Quantity of forest product collected or harvested per annum	For 2020, total volume of harvested timber is 429.28m ³ . Harvesting in 2020 was however halted due to COVID-19 pandemic.
3.3.4	State the purpose/use of the forest product.	Harvested teak is processed as round logs and sold to clients who export the products.
3.3.5	How do you collect or harvest these product (mechanism)	All harvesting operations are part of thinning. During thinning, trees are inspected by Forestry Commission (FC). Harvesting operations are carried out by a team. Felling of trees carried out with motor and manual techniques. After felling, extraction is done using tractor/winch combination to the road side.
3.3.6	Do you work manually or use equipment?	Equipment (chainsaws and tractors) are used for felling and extraction.
3.3.7	List equipment	Husqvarna 365 chainsaws, New Holland 6610S tractor, Igland 5002 Winch
3.3.8	Acreage operated/Size of land area covered	Total area harvested in 2020 is 82.4Ha. Harvesting operations were halted in February due to COVID-19 pandemic.

4.0 ENVIRONMENTAL, HEALTH AND SAFETY POLICY

4.1 Main environmental, occupational health and safety policy objectives for the year 2020

For the year 2020, FORM Ghana set out to achieve the following objectives on environmental, occupational health and safety policy:

Environmental Objectives:

- To ensure that our operational activities throughout 2020 are in conformance with the specified standards by local regulators such as Environmental Protection Agency, Water Resources Commission, Forestry Commission; and international organizations such as Forest Stewardship Council and African Development Bank.
- To ensure sound environmental practices through periodic monitoring of water quality, biodiversity restoration and conservation in the year 2020.
- To continuously improve waste segregation, disposal and reporting throughout 2020.

Occupational Health and Safety Objectives:

- To attain a Disability Injury Frequency Rate of not more than 1.0 by the end of 2020.
- To ensure the regular use of appropriate PPE's by employees throughout the year 2020.
- To conduct monthly Occupational Health and Safety trainings for employees throughout 2020.

4.2 What were your main environmental, occupational health and safety policy targets for the year? List them

For the year 2020, FORM Ghana set out to achieve the following targets on environmental, occupational health and safety policy:

Environmental Targets:

- To achieve minimal environmental pollution from waste and operational activities of the Company throughout 2020.
- Meet all environmental monitoring and reporting timelines for both local and international regulators/ institutions.
- To enhance biodiversity by adopting acceptable practices in 2020.

Occupational Health and Safety Targets:

- A reduction in the number of work-related injuries and incidents throughout the year 2020
- An improvement in the investigation and reporting of incidents (major and minor accidents)
- Increased awareness among employees on Occupational Health and Safety.

5.0 ENVIRONMENTAL MANAGEMENT ACTIVITIES

5.1 Types and quantities of waste generated by FG operations (liquid, farm waste, plastics)

Table 1.3: Waste Generation and management in FORM Ghana

Origin	Type	Reduction	Hazard Classification	Disposal	Tracing	Tracing
Workshop	Tyres	Reduced travel distance	non-hazardous	Stored on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Batteries (dry cell)	Use rechargeable batteries.	Hazardous	Stored in a designated container on site and collected by licensed waste management company (Zoomlion)	Keep way-bills	Zoomlion
	Batteries (vehicle) (lead-acid)	Quality brand choice	Hazardous	Stored on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Used oil	Scheduled servicing	Hazardous / potential for recycling	Stored on site and returned to supplier/licensed dealers	Keep waybills	Supplier (Total Petroleum Gh. Ltd – Akumadan).
	Oil filters	Scheduled servicing	Hazardous/ partial potential for recycling	Stored in a designated container on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
Plantation	Used cables, wreckage and other metal waste (scrap)		Hazardous / potential for recycling	Stored in a designated container on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Non-hazardous domestic waste (plastic)		Non-hazardous / potential for recycling	Stored in a designated container on site labelled Plastic (P) and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Non-hazardous waste (organic waste)		Non-hazardous/ potential for recycling	Stored in a designated container on site labelled Organic (O) and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Hazardous waste (paint, thinner containers)	Reduced use	Hazardous	Stored in a designated container on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Hazardous waste (pesticide package/container)	Bulk purchase	Hazardous	Stored separately on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion

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Origin	Type	Reduction	Hazard Classification	Disposal	Tracing	Tracing
	Waste from silvicultural/harvest operations	Adopting best silvicultural/harvesting techniques.	Non-hazardous	Left in field to decompose		
Office buildings	Fluorescent and other electric bulbs	Best possible quality.	Hazardous	Stored in a designated container on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
	Used Printer cartridges	Efficient printing practices, use of electronic documents	Hazardous	Stored in a designated container on site and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
Stores	Plastic waste (containers)	Reusing containers	Non- hazardous / potential for recycling	Stored in a designated container on site labelled Plastic (P) and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
Nursery	Plastic (Planting bags)	Use of teak stumps for planting	Non- hazardous / potential for recycling	Stored in a designated container on site labelled Plastic (P) and collected by licensed waste management company (Zoomlion)	Keep waybills	Zoomlion
Site Clinic/ First Aid Box	Medical waste		Hazardous	Are stored in a medical waste container on site and collected by a licensed waste management company (Zoomlion) upon request.	Keep waybills	Zoomlion

Table 1.4: Quantities of Waste Produced

Waste Streams	Quantity produced in 2020
a) Solid	
• Plastic	9,120kg
• Organic	9,220kg
• Used vehicle battery (number)	7
• Used tyres (number)	34
• Chemical waste/containers	25.29 kg
• Medical	15.2 kg
b) Liquid	
• Used oil	416 litres

5.2 How waste streams listed in 5.1 above are managed (handling, treatment and disposal)

FORM Ghana through its operational protocol on Waste Management (Protocol 04) continues to adopt stringent measures in handling and disposal of all waste. In the year under review (2020), a waste haulage and disposal contract with Zoomlion was renewed for all solid waste from FORM Ghana. Reports on quantity and management of all solid waste are produced by Zoomlion periodically. Used oil (liquid) is given back to suppliers (Total Petroleum Ghana Limited – Akumadan) for effective disposal.

Waste stream	Handling/Treatment	Disposal
Solid	Waste is sorted and stored in designated containers on site (Organic, Plastic, Medical, HazMat)	Zoomlion Ghana Limited.
Liquid		
Used oil	Stored separately on site	Total Petroleum Ghana Limited – Akumadan
Run-offs from washing of vehicles	Channelled into a decanter that separates oil and water	Oil is removed and given back to supplier (Total Petroleum Ghana Limited – Akumadan). Waste water is emptied into a septic tank.
Effluents from workforce	Channelled into a septic tank	Licensed liquid waste management company when needed.

5.3 Brief information on the bushfire prevention, control of weeds/pest and biodiversity conservation

a) Measures put in place to prevent bushfires

FORM Ghana has an intensive fire prevention program. The program is based on:

- Awareness raising among the neighbouring villages and the workers
- The creation of fire breaks
- Fire surveillance using four (4) fire towers
- Continuous posting of rapid response teams that have been specifically trained in firefighting.

b) Practices employed to control weeds and pest

The entire teak plantation has reached closed canopy stage and thus, weed growth is naturally suppressed. However, at specific spots where the trees are either young or growth is uneven with grown weeds, both manual and chemical weeding practices are used to control weeds. Regular surveillance in line with an operational protocol on integrated pest management (Protocol 29) guides the control of pest in the plantation. For the year 2020, no pest that required control were identified in the plantation.

c) Practices employed to conserve biodiversity

Biodiversity conservation is ensured by FORM Ghana through the protection of buffer zones within indigenous vegetation, strict control of hunting and through fire prevention. The

monitoring of the effect of these conservation measures is undertaken periodically within every 5years (latest report on flora monitoring is available at www.formghana.com).

5.4 List soil management practices undertaken (mulching, soil erosion control etc)

FORM Ghana protects the soil through reforestation practices and erosion control. Erosion control is mainly along the roads.

5.5 How did these practices contribute to increase in production levels?

No increase in production is detected or expected from soil management practices. However, management practices continue to conserve and stabilize the soil for suitable growth of the plantation.

5.6 Did you experience disease/pest infestation?

No disease/pest infestation was experienced in the Asubima and Afrensu-Brohuma forest reserves for the year 2020.

- a) If yes indicate the type(s) of disease(s)
- b) How were the diseases/pest treated/managed?

No disease/pest infestation was experienced.

- c) Practices employed to manage admitted farms

No admitted farms are found within the FORM Ghana area in Asubima and Afrensu-Brohuma Forest Reserves.

- d) Practices employed to manage neighbouring communities

FORM Ghana actively engages neighbouring communities through the organisation of stakeholder meetings and sensitisation fora. For the year 2020, stakeholder meeting was organised on the 08/09/2020.

- e) Practices employed to manage livestock grazing/fire

Livestock grazing is not allowed in forest reserves and no incident of grazing was recorded throughout 2020 in the Asubima / Afrensu-Brohuma forest reserves. Fire is managed as discussed under Section 5.3a above.

5.7 Brief information on the chemical management and practices to prevent/control discharges of chemical contaminants into the environment

5.7.1 Chemical management

a) Quantity of chemicals utilised and final disposal of containers, unused or expired products

Type of Chemical	Source	Quantity used 2020	Disposal of Containers	Qty of unused or expired products
Glyphosate (Kalach/Sunphosate/Glyphader)	Dizengoff, Accra	1747 kg	Stored separately on site for final disposal by Zoomlion	None

*MSDS for chemical attached in Appendix

b) Management practices in place to prevent/ control discharges of chemicals contaminants into the environment

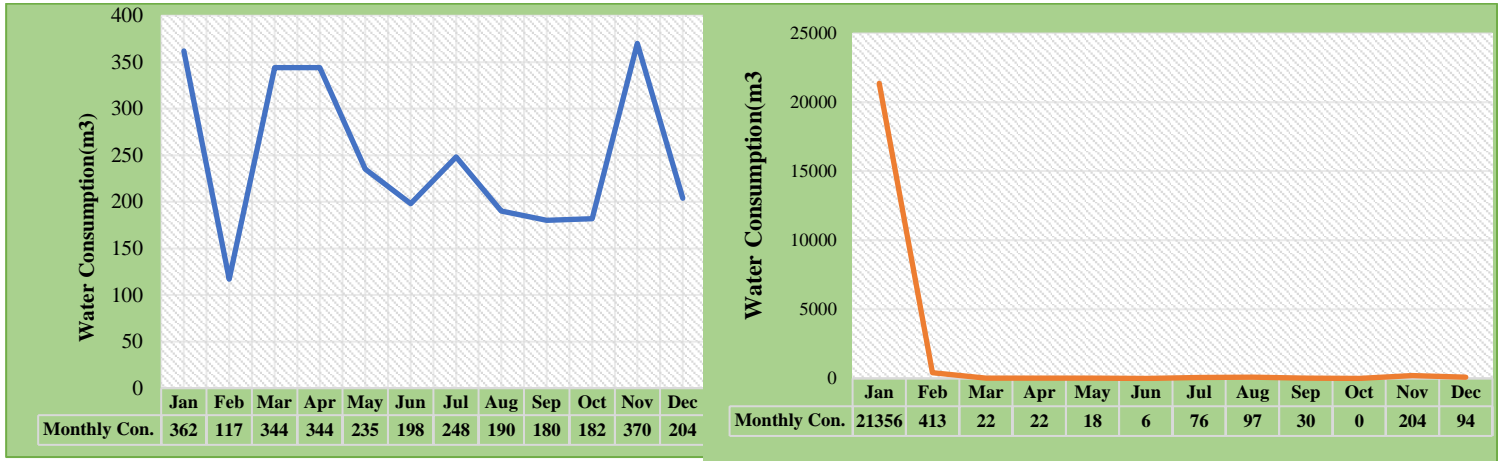
<p>FORM Ghana through its protocols and procedures continues to adopt best practices to prevent/control chemical contaminants from being discharged into the environment. Key practices as outlined in Protocol 05 on Responsible use of pesticides, Protocol 04 on Waste Management and P16 on Storage of Fuels, lubricants and toxins, include:</p> <ul style="list-style-type: none"> • Chemicals are stored separately from oils, fuels and lubricants in a secured and watertight place. • In case of a minor leakage of fuels, lubricants or chemicals the spillage is soaked up with sawdust until the floor is dry. The saturated sawdust is disposed of into a designated waste bin for hazardous materials. • All major spillages drain into ponds and are collected into containers. The remaining spillage is soaked up with sawdust until the floor is dry. • All storage areas are furnished with impermeable materials (concretized, metallic) to prevent all spills from contaminating the soil. • Empty chemical containers/wastes are stored separately on site and disposed of in accordance with acceptable practices.

5.8 Indicate resource use (water and energy) for reporting year

Table 1.5: FORM Ghana Resource Use for 2020

Type of Resource	Quantity used
Water	
Borehole	2974 m ³
Irrigation	22338 m ³
Energy	
Grid Power (VRA/NEDCo) – Purchased	33722.4 kWh
Renewable (Solar) – Company Generated	10635 kWh
Diesel	45607 litres
Petrol	3336 litres
Oil (Lubricants/Engine oil/stroke oil)	618.5 litres

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Borehole water consumption for 2020

Irrigation water consumption

Figure 1.3: Water Consumption for 2020

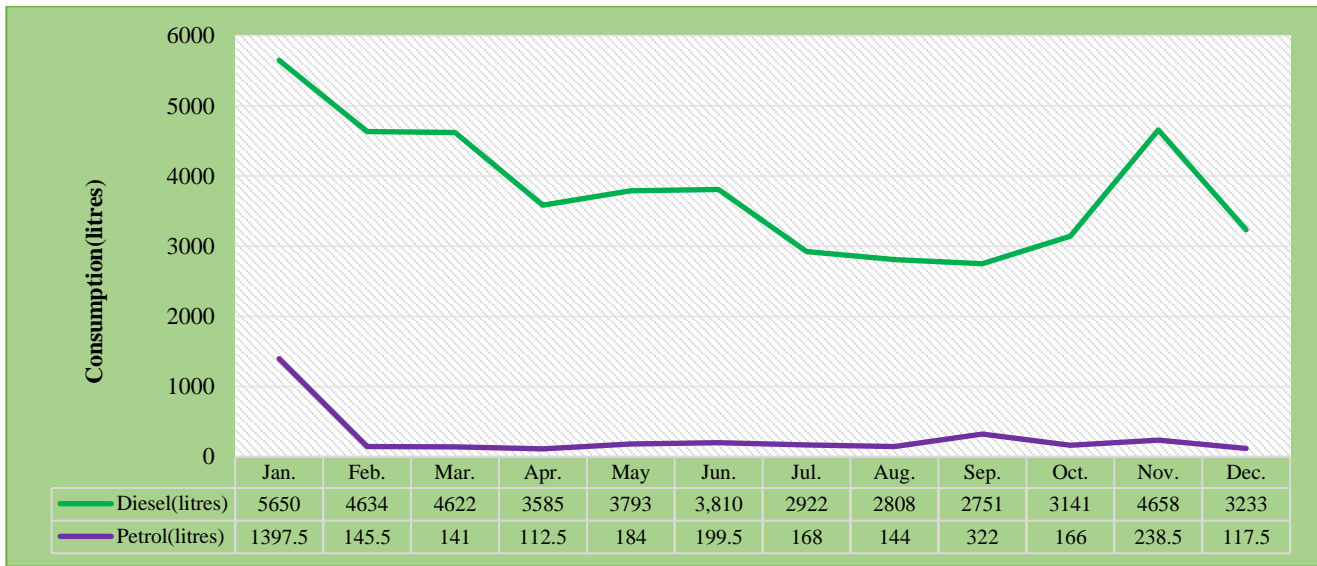


Figure 1.4: Fuel Consumption for 2020

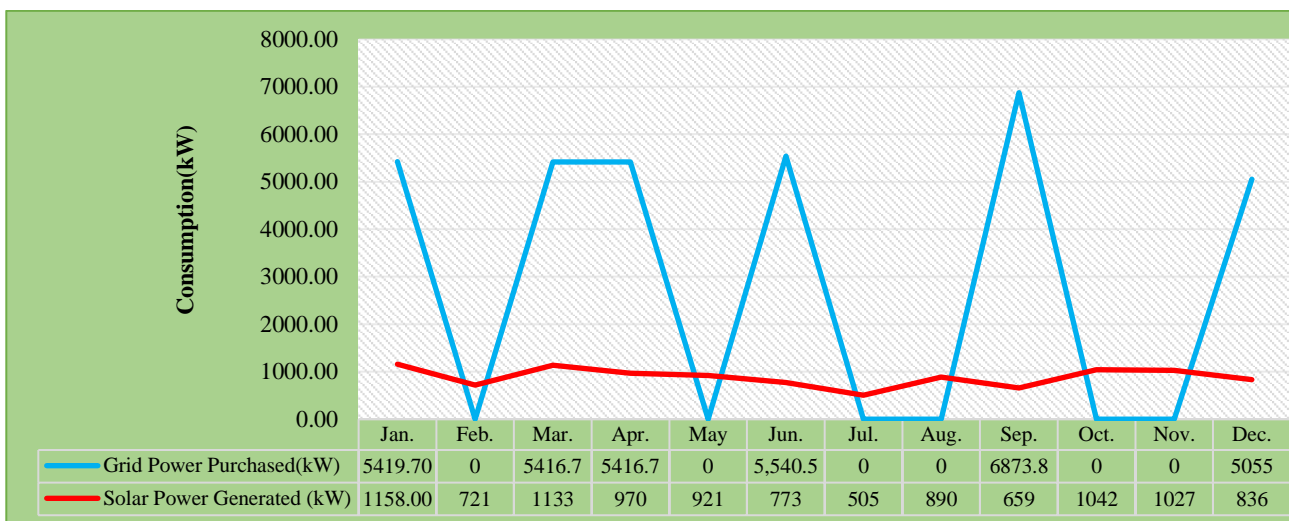


Figure 1.5: Electricity Consumption for 2020

5.9 Explain the variation (increase/decrease) in trend

Water Use:

The variation in water use is largely dependent on seasonal changes. Thus, weather conditions such as raining season and the dry season lessen vis-à-vis increase water demand respectively. From both consumption and irrigation graphs (see Figure 1 above), water demand is high between November and February. Irrigation of nurseries ends in February to allow for hardening of seedlings while use of borehole water continues to rise due to the presence of workers, until April when the raining season starts. Between April and November, water use for both consumption and irrigation are generally low.

Fuel Consumption:

FORM Ghana uses petrol, diesel and oil to operate various machinery in the plantation. Majority of the machinery in FORM Ghana including operational vehicles and generator are powered by diesel and hence, the graphical peak of diesel throughout the year in the fuel category as seen in Figure 2. Other machines such as motorcycles, chainsaw machines, Bakkie-Sakkies and vehicle washing machine also use petrol. This explains why the consumption of petrol is the second highest in the fuel category. On the other hand, oil (consisting of lubricants, stroke oil, engine oil) are low throughout the year due to interval usage such as during vehicle servicing or during the operation of chainsaws.

Electricity Consumption:

FORM Ghana generates its own electricity from solar and complements its power needs from purchase of grid power from ECG/NEDCo. While the consumption of solar power gently changes from month to month, there are sharp fluctuations with grid power. Weather conditions (such as cloudy weather) coupled with the need for power account for the decline in solar power from April to July. Grid power was not purchased in months such as February, July, August, October and November because, power from solar together with surplus from previous months were able to cater for demand.

6.0 OCCUPATIONAL HEALTH AND SAFETY (OHS)

6.1 Indicate any OHS training undertaken during the year under review

Table 1.6: FORM Ghana OHS Trainings undertaken in 2020

Date	Topic	Participants
24/01/2020	Fire fighting	29Permanent
20/03/2020	COVID-19	115Permanent, 22Casual
23/03/2020	Chainsaw Refresher Training	17Permanent
26/03/2020	General fleet user practical assessment	11Permanent, 2Casuals
04/06/2020	Waste Management	134Permanent
16–17/06/20	First Aid refresher training	81Permanent
19/06/2020	Chemical weeding refresher training	16Permanent
16/07/2020	Snake and Insect Bite	2Casual, 155Permanent
14/08/2020	Defensive Driving Fundamentals	2Casual, 13Permanent
19/08/2020	Security issues	33Permanent
28/08/2020	Personal Hygiene	116Permanent, 4Casual
28/08/2020	HIV/AIDS awareness and screening	116Permanent, 4Casual
01/09/2020	COVID-19 Refresher training	110Permanent, 4Casual
7–11/09/20	Forest Fire Refresher Training	22Permanent, 2Casual
08/09/2020	COVID-19 Protocol Training	132Permanent, 4Casual
01/10/2020	Transport Protocol	12Permanent, 2Casual
28/10/2020	Training on Complaints, Grievance and Concern	4Permanent
30/10/2020	Communicable disease	110Permanent, 4Casual
10–11/11/20	Pruning training	46Permanent ,4Casual
16/11/2020	Forest Fire fighting	27Permanent, 25Casual

6.2 Did you undertake medical check-up for staff?

If yes, indicate the number of staff and frequency

Medical check-up was carried out for 15 chemical sprayers.

6.3 Have you registered staff under any health insurance scheme? If yes, name scheme

Yes, FORM Ghana workers are registered under the National Health Insurance Scheme of Ghana.

6.4 Do you have the following?

Washrooms	Four (4) units are available on site for use
Personal Protective Equipment	Specific PPE's are provided for various job roles in line with FORM Ghana's Protocol on Personal Protective Equipment (P10).
First aid kit	Each team in the field has a first aid kit and a trained first aider. All vehicles have first aid kits. In addition to the First aid kits, a Clinic is available on site to provide first hand medical services.
Fire extinguisher and other safety equipment	Fire extinguishers are kept at strategic locations on buildings at site. All vehicles are also equipped with fire extinguishers. Other safety equipment includes: smoke detectors, firefighting equipment and emergency assembly point.

6.5 Did you record any accidents during the year?

Table 1.7: Types of accident and frequency recorded in FORM Ghana for 2020

Throughout 2020, ninety (90) work related minor accidents were recorded in the plantation. Also, **four (4) major accidents** were recorded. Majority (69) of the accidents were recorded during manual weeding. The table below gives details of the accident records for the year:

<i>Type of accident</i>	<i>Frequency</i>	<i>Nature of accident (Major/Minor)</i>
Insect bites	40	All minor
Lacerations	48	Minor 46/Major 2
Bruises	3	All minor
Fracture	2	All major
Sprain	1	Minor
Total	94	<p>*Major: Accidents requiring suturing either at site clinic or hospital.</p> <p>*Minor: Accidents which are managed either with first aid or at the site clinic and do not require suturing.</p>

6.6 What accounted for these accidents?

Accidents from insect bites were often from bees in the plantation while lacerations were mostly as a result of accidental slip-off of cutlass.

6.7 How were the accidents managed?

FORM Ghana places priority on Occupational Health and Safety of its workforce. Hence, the company has laid down procedures to conduct investigation on all accidents that result in injuries. After investigations are conducted, corrective/remedial actions are put in place to forestall the recurrence of similar accidents. Victims of work-related accidents are usually attended to by trained first aiders and transferred to the site clinic. A trained health practitioner at the clinic assesses the injury and treats the victim or refer to the hospital.

6.8 Brief on Company’s emergency response plan?

FORM Ghana has a protocol which outlines the actions to be taken in the case of an emergency. This is Protocol 08 First Aid Procedures & Emergency Evacuation. The protocol makes provisions for first aid training, usage and composition of the first aid kit and handling of accidents. In addition to the protocol, FORM Ghana has put in place emergency control measures such as installation of smoke detectors, creation of assembly point, posting of warning/caution signages on buildings and equipping every vehicle and building with fire extinguishers.

6.9 *Community social responsibility*

As part of FORM Ghana’s social sustainability principle, the enhancement of the wellbeing of communities within the fringes of the reserve is key. The Company thus strives to maintain a cordial relationship through regular engagement and aiding in projects as part of its corporate social responsibility. For the year 2020, the table underneath gives details of the various activities carried out in line with the Company’s community social responsibility:

<i>Date</i>	<i>Activity</i>	<i>Location</i>	<i>No. of Participants</i>
04/02/2020	Community development project – Sod cutting event for the construction /facelift of Faith Primary School.	Akumadan	20
16-17 /03/2020	Independent Resettlement Action plan audit by FORIG.	Berekum /Akumadan	5
14/05/2020	Community meeting – Discussion on illegal activities in the plantation.	Akumadan (Apesika)	16
17/07/2020	Durbar – Handling over of six-unit classroom block to Akumadan township.	Akumadan	200
08/09/2020	Stakeholder meeting – First stakeholders meeting with fringing Communities, Forestry Commission, Ghana National Fire Service, Chiefs & Elders, Stool Lands, and Farmers.	Akumadan	46

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16/11/2020	Community visit – Fire education and social monitoring survey.	Akumadan (Esereso/Konkomba)	26
17/11/2020	Community visit – Fire education and social monitoring survey.	Akumadan (Atrensu)	20
18/11/2020	Community visit – Fire education and social monitoring survey.	Akumadan (Apesika & Nkubem)	25
19/11/2020	Community visit – Fire education and social monitoring survey.	Akumadan (Joe Nkwanta)	21
20/11/2020	Community visit – Fire education and social monitoring survey.	Akumadan (Amponsakrom & Nkukuasua)	52
21/11/2020	Community visit – Fire education and social monitoring survey.	Akumadan (Meta)	41
12/2020	Domestic firefighting training	Akumadan	26

7.0 ENVIRONMENTAL MONITORING

7.1 Water Quality Monitoring data

Table 1.8: Water Quality Monitoring Data for Site Borehole – Akumadan

Parameter	Standard Specification	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Total Dissolved Solids	1000 mg/l	17.00	23.00	17.00	19.00
pH	6.5-8.5	5.38	6.24	5.82	5.92
Temperature (°C)	-	29.70	29.20	27.30	29.30
Nitrate (mg/l)	50	0.50	2.10	0.25	3.50
Ammonia (mg/l)	1.5 mg/l	0.00	0.05	0.10	0.30
Phosphate (mg/l)	0.3 mg/l	0.20	0.25	1.23	1.12
Turbidity (NTU)	5	0.00	0.08	0.48	0.00
COD					

Table 1.9: Water Quality Monitoring Data for Asubima Stream – Akumadan Plantation

Parameter	Standard Specification	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
		US	DS	US	DS	US	DS	US	DS
Dissolved Solids (mg/l)	-	29.00	37.00	46.00	36.00	23.00	22.00	20.00	19.00
pH	6.5-9.0	6.28	6.17	6.70	6.70	6.51	6.37	6.21	6.17
Temperature (°C)	-	29.20	29.30	29.20	29.20	27.30	27.30	29.50	29.70
Nitrate (mg/l)	-	3.00	4.00	4.56	6.20	8.25	4.00	3.00	1.90
Ammonia (mg/l)	0 – 1.0	0.00	1.50	0.21	0.30	0.20	0.08	0.25	0.12
Phosphate (mg/l)	-	0.16	0.22	0.18	0.22	3.32	2.90	4.52	2.23
Turbidity (NTU)	0 – 75.0	5.41	6.86	4.15	2.36	37.11	8.12	17.47	9.22

*US – Upstream; DS – Downstream

Table 1.10: Water Quality Monitoring Data for Afrensu-Brohuma Stream – Akumadan Plantation

Parameter	Standard Specification	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
		US	DS	US	DS	US	DS	US	DS
Dissolved Solids (mg/l)	-	54.00	35.00	33.00	30.00	26.00	24.00	26.00	24.00
pH	6.5-9.0	5.94	6.24	6.55	6.52	6.27	6.25	6.11	6.00
Temperature (°C)	-	29.20	29.10	29.20	29.20	27.30	27.30	29.60	29.70
Nitrate (mg/l)	-	2.80	2.50	5.21	4.56	4.25	3.75	2.50	2.60
Ammonia (mg/l)	0 – 1.0	0.00	0.00	0.18	0.07	0.13	0.03	0.15	0.12
Phosphate (mg/l)	-	0.23	0.18	0.24	0.20	2.28	3.05	1.83	2.19
Turbidity (NTU)	0 – 75.0	7.48	8.40	2.01	6.24	9.86	14.72	9.72	13.96

*US – Upstream; DS – Downstream

7.2 Variations (trends) between the baseline and current values of rivers that traverse the plantation

Table 1.11: Comparison of Baseline and current water quality parameters of Asubima Stream

Parameter	Baseline	Current Values 2020							
		Quarter 1		Quarter 2		Quarter 3		Quarter 4	
		US	DS	US	DS	US	DS	US	DS
Dissolved Oxygen	0.80	29.00	37.00	46.00	36.00	23.00	22.00	20.00	19.00
pH	6.72	6.28	6.17	6.70	6.70	6.51	6.37	6.21	6.17
Temperature	-	29.20	29.30	29.20	29.20	27.30	27.30	29.50	29.70
Nitrate	24.70	3.00	4.00	4.56	6.20	8.25	4.00	3.00	1.90
Ammonia	-	0.00	1.50	0.21	0.30	0.20	0.08	0.25	0.12
Phosphate	-	0.16	0.22	0.18	0.22	3.32	2.90	4.52	2.23
Turbidity	6.15	5.41	6.86	4.15	2.36	37.11	8.12	17.47	9.22

7.3 Explain variations observed

From the comparison, FORM Ghana’s activities in the Asubima Forest Reserve have a positive contribution to the enhancement of water quality parameters especially on dissolved oxygen level and turbidity. Variations in parameters can be attributed to conservation practices such as creation of buffer areas along water bodies, restoration of riparian zone vegetation and avoidance of chemical use within buffer zones.

8.0 MEASURES TO IMPROVE ON FORM GHANA'S PERFORMANCE (ENVIRONMENTAL QUALITY AND OPERATION)

For the ensuing production year 2021, FORM Ghana will continue to improve its performance in conformity with national and international requirements. The Company's Environmental and Social Management Plan (ESMP) and operational protocols in line with FSC Principles and Criteria shall provide a guiding framework for continuous improvement. As part of environmental quality and operational performance measures, the Company shall:

- Continue to ensure strict adherence to standard recommendations for the use of approved chemical pesticides with adequate measures to minimize the impact on biotic and abiotic environmental media.
- Conduct regular trainings on appropriate waste management approaches in line with the Company's protocol on waste management (Protocol 04).
- Continue to enforce periodic monitoring of environmental parameters within the Company's area of influence.
- Continue to conserve biodiversity and assess the impact of conservation measures through a flora and fauna survey.


CONCLUSION


In the year 2020, FORM Ghana just as the rest of the world had to strategically plan its operations to avoid the contraction and spread of the novel COVID-19. As part of strategic decisions, conscious efforts were made to ensure that various requirements for environmental, social, and health and safety safeguards were stringently complied with. Guided by operational protocols, FORM Ghana's environmental aspects such as biodiversity conservation, waste management, chemical use, resource use and others were monitored. The Company as well undertook projects to fulfil its social responsibility mandate. Also, in line with an OHS Policy, FORM Ghana in the year 2020 pursued the health and safety of its employees through measures such as safety trainings, medical screening, health insurance and provision of safety materials.

APPENDICES

Appendix A: Material Safety Data Sheet for Glyphosate Chemical Pesticide

MSDS for Sunphosate

	<p>WYNCA SUNSHINE AGRIC PRODUCTS & TRADING CO. LTD</p>
	<p>ADD: BLOCK 2A, PLOT NO.10, DADEBAN ROAD, NORTH INDUSTRIAL AREA, ACCRA, GHANA. P.O.BOX: CTT1883 ACCRA FAX: 0302-221132 TEL: 0302-221132</p>
<p><u>SUNPHOSATE GRANULAR 757SG</u></p>	
<p><u>PRODUCT USAGE AND SAFETY PRECAUTIONARY MEASURES</u></p>	
<p>WARNING</p>	
<ul style="list-style-type: none"> • Read label first before using product 	
<p>PRECAUTION</p>	
<ul style="list-style-type: none"> • Do not eat, drink or smoke when handling the product. • Avoid contact with eyes or skin • Wear suitable protective clothing/keep product away from food, feed and drinks. • Do not contaminate any water body with left over spray solution • Do not use empty containers, punch and destroy them. • Wash hands, face and change clothes after use. 	
<p>FIRST AID</p>	
<ul style="list-style-type: none"> • Get medical aid immediately • If in EYES, flush eyes with plenty of water for 15 minutes. • If on SKIN, wash skin thoroughly with soap and plenty of water for 15 minutes. • If SWALLOWED, immediately dilute by drinking milk or water. 	
<p>ANTIDOTE</p>	
<ul style="list-style-type: none"> • No special antidote. 	
<p>CAUTION</p>	
<ul style="list-style-type: none"> • Safely keep out of reach of children. 	
<p>GENERAL INFORMATION</p>	
<ul style="list-style-type: none"> • SUNPHOSATE-G is a systemic, non-selective foliar herbicide which when applied is absorbed by the green parts of the plant. It translocates into the plant and kills it entirely. • It is used in forestry, tree crops and the control of aquatic weeds. • SUNPHOSATE-G has no residual soil activity and it is used in "zero tillage" in maize production. 	
<p>DIRECTION FOR USE</p>	
<ul style="list-style-type: none"> • Apply product on active growing weed. • Do not apply product if rain threatens 	



WYNCA

**WYNCA SUNSHINE AGRIC PRODUCTS & TRADING CO.
LTD**

ADD: BLOCK 2A, PLOT NO.10, DADEBAN ROAD, NORTH INDUSTRIAL AREA,
ACCRA, GHANA. P.O.BOX: CT1883 ACCRA

FAX: 0302-221132 TEL: 0302-221132

- Avoid spray drift to nearby crops
- Spray at a low pressure to give uniform average droplets on the target weeds.

EQUIPMENT

- Apply with knapsack or mounted boom sprayers.

RECOMMENDATION

- Rate of application for annual grasses with the height of 30cm – apply 2.25kg/ha to cover 10000m², For perennial grasses – apply 3kg/ha. For sedges and other difficult weeds e.g. Imperata sp etc. Apply 4kg/ha.
- Do not enter field 7 hours after spray
- Water volume: Apply 450 – 600 litres of water per hectare depending on the weed density.
- With knapsack sprayers. Apply 50g – 80 g in 15 – 16litres of water.

MSDS for Glyphader

GLYPHADER® 75	Date created : 15/03/07	
MATERIAL SAFETY DATA SHEET		
Page 1 / 4		
1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION		
SUPPLIED BY :	SCPA SIVEX INTERNATIONAL 83-85 Boulevard Vincent Auried 75013 Paris - FRANCE TEL. +33 1 44 06 53 00 FAX. +33 1 44 06 54 66	
PRODUCT :	Glyphosate	
CHEMICAL NATURE	Water Soluble Granule (SG)	
CHEMICAL FAMILY/USE:	Glyphosate 680 g/Kg a.e. = 757 g/Kg Ammonium salt of Glyphosate Aminophosphonic ; Glycine derivative/ Herbicide	
FORMULA:	C ₃ H ₅ N O ₃ P	
CHEMICAL SYNONYMS:	IUPAC: N-(phosphonomethyl) glycine	
2. COMPOSITION/INFORMATION ON INGREDIENTS		
Ingredients	Content	CAS NO
Active ingredient: GLYPHOSATE Salt of ammonium :	75.7 % w/w min	1071-83-6
Other ingredients: Surfactant and formulating ingredients.	24.3 % w/w	
Sodium sulphite	0.5 % w/w max	
3. HAZARDS IDENTIFICATION EMERGENCY OVERVIEW		
EMERGENCY OVERVIEW: WARNING-POISON. Keep out of reach of children. Avoid contact with skin, eyes and clothing. Do not inhale fumes. Severely irritating to eyes. May cause skin irritation. Harmful if absorbed through the skin. Harmful if swallowed or inhaled.		
EFFECTS OF ACUTE EXPOSURE:		
INGESTION:	Harmful if swallowed. May cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, and muscle spasms.	
SKIN CONTACT:	May cause slight transient irritation. Overexposure by skin absorption may cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, and muscle spasms.	
INHALATION:	Contains materials that may be moderately toxic. Vapours could cause headache, dizziness, respiratory irritation and symptoms similar to those from ingestion.	
EYE CONTACT:	Causes severe eye irritation including corneal opacity and irreversible eye damage. Causes redness and tearing. Vapours and mist can cause irritation.	
MEDICAL CONDITIONS AGGRAVATED: Skin exposure may aggravate preexisting skin conditions. Inhalation of mist may aggravate preexisting respiratory conditions.		
PRINCIPLE ROUTES OF EXPOSURE: Eye contact. Skin absorption. Inhalation. Oral.		
CHRONIC EFFECTS/CARCINOGENICITY: No effect		
REPRODUCTIVE TOXICITY: No effect		
GENOTOXICITY: No		
TOXICOLOGICALLY SYNERGISTIC MATERIALS: NA.		
OTHER: None known.		
4. FIRST AID MEASURES		
CROP PROTECTION DEPARTMENT		

GLYPHADER® 75	Data created : 13/05/07
Page 2 / 4	
MATERIAL SAFETY DATA SHEET	
INGESTION:	Never give anything by mouth to an unconscious person. Get medical attention and show the product label.
SKIN:	In case of contact, remove contaminated clothing and wash skin thoroughly with soap and water.
INHALATION:	If inhaled, remove to fresh air and get medical attention or contact a Poison Control Centre.
EYES:	For eye contact, flush with plenty of water for at least 15 minutes. Get immediate medical attention.
NOTE TO PHYSICIAN:	Symptomatic treatment.
5. FIRE FIGHTING MEASURES	
FLASH POINT:	No object
CONDITIONS OF FLAMMABILITY:	No Flammable
FLAMMABLE LIMITS IN AIR - Upper (%):	NA.
FLAMMABLE LIMITS IN AIR - Lower (%):	NA.
AUTOIGNITION TEMPERATURE:	NA.
SENSITIVITY TO MECHANICAL IMPACT (Y/N):	NA.
SENSITIVITY TO STATIC DISCHARGE:	NA.
EXTINGUISHING MEDIA:	Dry powder, carbon dioxide, water or foam.
SPECIAL FIREFIGHTING PROCEDURES:	<p>Special fire fighting procedures: Isolate fire area. Evacuate the employees and evacuate downwind.</p> <p>Avoid spreading of contaminated extinguishing agent in the environment. Minimize use of water to prevent environmental contamination. Do not breathe smoke, gases, or vapour generated. Keep fire exposed containers cool by spraying with water. Wear full protective</p> <p>Firefighters should wear self-contained breathing apparatus and full protective clothing when fighting chemical fires. Minimize and contain water runoff. Equipment should be thoroughly decontaminated after use.</p>
6. ACCIDENTAL RELEASE MEASURES	
ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:	
<p>Use safety equipment and procedures appropriate to the size of the spill. Keep unnecessary people away. Avoid runoff to natural waters and sewers. Surround and absorb spills with inert material such as perlite, sawdust, clay granules, vermiculite, sand or dirt. Contain all affected material in a closed, labelled container for proper disposal. Isolate from other waste materials. Clean contaminated area such as hard surfaces with detergent and water, collecting cleaning solution for proper disposal. Large spills to soil or similar surfaces may necessitate removal of top soil. Clean contaminated floors and objects thoroughly, observing environmental regulations. Do not discharge into the drains/surface water/groundwater. Keep people and animals away.</p>	
7. HANDLING AND STORAGE	
HANDLING:	Avoid contact with the eyes, skin and clothing and avoid inhalation of product or spray mist. If in eyes, wash it immediately with water. After handling and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water.
STORAGE:	Store in the closed, original container in a dry, cool, well-ventilated area, out of direct sunlight. Store in locked room or place away from children, animals, food, animal feed, seed and fertilizers. Keep away from all ignition sources and protect from extreme heat and cold.
8. EXPOSURE CONTROLS/PERSONAL PROTECTION	
CROP PROTECTION DEPARTMENT	

GLYPHADER® 75

Date created : 15/05/07

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MATERIAL SAFETY DATA SHEET

ENGINEERING CONTROLS:	Use in a well ventilated area. General ventilation with a good source of make-up air recommended as minimum for indoor situations. Ventilation should be adequate to maintain air concentrations below exposure limits.
RESPIRATORY PROTECTION EQUIPMENT:	Use an approved pesticide respirator if ventilation is not adequate or exposure to sprays, mists or vapours is likely.
PROTECTIVE GLOVES:	All types of chemical-resistant gloves for handling chemicals are acceptable, provided that they can be cleaned. Rinse gloves before removal. Gloves are not required for applicator in enclosed tractor or airplane cockpit.
EYE AND FACE PROTECTION:	Goggles or face shield when handling concentrate.
OTHER PROTECTIVE EQUIPMENT:	Long sleeved shirt, long pants, socks and shoes are minimum work clothing. Coveralls or a chemical-resistant apron should also be worn when open pouring from containers greater than 5L. Use other equipment appropriate to specific situation.
VENTILATION:	Use only in well ventilated area.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT:	> 190 °C
VAPOR PRESSURE:	9 x 10 ⁻³ mPa (25°C)
VAPOR DENSITY (air = 1):	NA.
FREEZING POINT:	NA.
MELTING POINT:	> 190°C
PHYSICAL STATE:	Slightly yellow to white granular
ODOUR:	Specific odour
COLOUR:	Slightly yellow to white
ODOR THRESHOLD (ppm):	NA
EVAPORATION RATE (butyl acetate = 1):	NA.
SPECIFIC GRAVITY (water = 1):	NAp
DENSITY (20°C):	550 g/l ± 50 (bulk density)
pH:	4.0 – 6.0
SOLUBILITY IN WATER (25°C):	144 ± 19 g/l (pH 3,2)
COEFFICIENT OF WATER/OIL DISTRIBUTION:	K _{ow} logP= < - 3.7

Note: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

10. STABILITY AND REACTIVITY

STABILITY:	Stable.
HAZARDOUS POLYMERIZATION:	Not known to occur.
HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:	None known
INCOMPATIBILITY (MATERIALS TO AVOID):	Can induced a reaction with metal (do not store or use this product in iron, galvanized steel or no varnish)
CONDITIONS TO AVOID:	None known.

11. TOXICOLOGICAL INFORMATION

ORAL LD50	Rat	4230	mg/kg
DERMAL LD50:	Rat	> 5000	mg/kg
4 HOURS INHALATION LC50:	Rat	> 5	mg/L
EYE IRRITATION:	Rabbit	Mild eye irritant	
SKIN IRRITATION :	Rabbit	Mild skin irritant	
SKIN SENSITIZATION :	Guinea pig	Not sensitizing	

Note : Data are from laboratory studies conducted on GLYPHOSATE.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

GLYPHADER® 75

Date created : 15/05/07

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MATERIAL SAFETY DATA SHEET

96-HOUR LC50:	Rainbow trout	86	mg/L
96-HOUR LC50:	Bluegill sunfish	120	mg/L
48-HOUR EC50:	Daphnia magna	780	mg/L
LD50:	Bobwhite quail	>3851	mg/kg
ORAL LD50:	Bees	100	µg/bee
CONTACT LD50:	Bees	100	µg/bee

Note : Data on Active Ingredient.

ENVIRONMENTAL FATE INFORMATION:

In mammals, following oral administration, glyphosate is very rapidly excreted unchanged and does not bioaccumulate. In plants, slowly metabolised to aminomethylphosphonic acid, which is the major plant metabolite. In soil (field), DT50 1-30 days, depending on edaphic and climatic conditions. In water, DT50 varies from a few to 91 days. Photodegradation in water occurs under natural conditions, DT50 33-77 days; no substantial photodegradation in soil was recorded over 31 days. In a lab. whole system with water and sediment, DT50 27-146 days (aerobic), 14-22 days (anaerobic). The major metabolite in soil and water is aminomethyl phosphonic acid.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:

For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Disposal should be made in accordance with federal, provincial and local regulations. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean up of spills. Emptied container retains vapor and product residue. Observe all labelled safeguards until container is cleaned, reconditioned or destroyed. Do not reuse container for any purpose. If applicable, return container in accordance with return program. If a recyclable container, dispose of at a container collection site. Contact local distributor, dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site, triple or pressure rinse the empty container adding rinsing to spray tank, and make container unsuitable for further use. If there is no container collection site in your area, dispose of the container in accordance with provincial requirements.

14. TRANSPORT INFORMATION

RAIL/ROAD (RID/ADR):	9
SEA (IMDG):	9
AIR (ICAO/IATA):	9
U.N. NUMBER:	3077
DG CLASS:	NA
HAZCHEM CODE:	9
PACKING GROUP:	III

15. REGULATORY INFORMATION

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another, it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

16. OTHER INFORMATION

ADDITIONAL INFORMATION:

Abbreviations used throughout the MSDS are: NA = Not available
NAp = Not applicable
N/E = None Established.

This MSDS summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace including in conjunction with other products. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact this company. Our responsibility for products sold is subject to our standard terms and conditions, a copy of which is sent to our customers and is also available on request.

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END OF MSDS



Arysta LifeScience

Product Name: Kalach 700 WSG

Page 2 of 5

Skin contact:

Move the victim to fresh air and remove all contaminated clothing, shoes and leather goods. Gently wipe off excess chemical. Wash affected skin areas gently and thoroughly with water and non-abrasive soap. Do not rub the skin. If irritation persists, seek medical advice.

Eye contact :

Immediately flush the eyes with clean, gently flowing lukewarm water or saline solution for 20 minutes, holding the eyelid(s) open. If irritation persists, seek medical advice.

Ingestion:

Have victim rinse mouth thoroughly with water. Do not induce vomiting. Seek medical advice immediately showing container and label.

Advice to physician:

There is no specific antidote. Treat symptomatically and supportively as and when required. Remove by gastric lavage and catharsis, but not if victim is unconscious. Give oxygen if respiration is depressed.

SECTION 5 - FIRE-FIGHTING MEASURES

Keep fire exposed containers cool by spraying with water.

Fire and explosion hazard:

Flash point: None. This material is not flammable.

Extinguishing agents:

Extinguish fires with carbon dioxide, dry powder, or alcohol-resistant foam. Water spray can be used for cooling of unaffected stock, but avoid water coming in contact with the product. Use as little water as possible. Use spray or fog. Solid stream may cause spreading. Contain water used for fire fighting for later disposal.

Fire fighting:

Remove spectators from surrounding area. Remove container from fire area if possible. Contain fire control agents for later disposal. Use a recommended extinguishing agent for the type of surrounding fire. Avoid inhaling hazardous vapours and fumes from burning materials. Keep upwind.

Personal protective equipment:

Fire may produce irritating or poisonous vapours (toxic fumes of carbon monoxide, phosphorous oxides and nitrogen oxides), mists or other products of combustion. Fire fighters and others that may be exposed should wear full protective clothing and self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES (SPILLAGE)

Personal precautions:

Do not breathe in mist or fumes. Avoid contact with skin and eyes. For personal protection see Section 8.

Environmental precautions:

Do not allow entering drains or watercourses. Spillage or uncontrolled discharges into water courses (or public waters) to be reported immediately to the Police and to the Department of Water/Environmental Affairs.

Occupational spill:

Remove all sources of flames and sparks. Adsorb spillage onto sand, earth or any suitable adsorbent material. Transfer to a container for disposal. Wash the spillage area with water. Washings must be prevented from entering surface water drains. Do not flush spilled material into drains. Keep spectators away.

Containers:

Emptied containers retain material residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

SECTION 7 - HANDLING AND STORAGE REQUIREMENTS

Handling:

Avoid contact with eyes, prolonged contact with skin, and inhalation of spray and fumes. Handle product with caution. Use with adequate ventilation. Wash hands before eating, drinking, chewing gum, smoking or using the toilet. Remove clothing immediately if the herbicide gets inside. Then wash skin thoroughly using a non-abrasive soap and put on clean clothing. Operators should change and wash clothing after use. Do not apply directly to areas where surface water is present, or to intertidal areas below the mean high water mark. Water used to clean equipment must be disposed of correctly to avoid contamination.

Storage:

Store in its original, labelled and closed container in dry, cool, shaded, well-ventilated area, away from heat, sparks and other sources of ignition. Do not store with other pesticides, fertilizer, seeds, foodstuffs and water supplies. Store away from incompatible substances. Product is incompatible with galvanized steel or unlined mild steel. Keep out of reach of unauthorized persons, children and animals. Local regulations should be complied with.

MATERIAL SAFETY DATA SHEET

Issued by: Arysta Lifescience South Africa

Phone: 031 514 5600

Poison Information Centre: 082 446 8946; Tygerberg: (021) 931 6129; Poison Emergency Enquiry: (021) 689 5227



SECTION 8 - EXPOSURE CONTROL/PERSONAL PROTECTION

It is essential to provide adequate ventilation. The measures appropriate for a particular work site depend on how this material is used and on the extent of exposure. Ensure that control systems are properly designed and maintained. Comply with occupational safety, environmental, fire and other applicable regulations.

Exposure standards:

The ADI for Glyphosate is set at 0.3 mg/kg/day. The corresponding NOEL is set at 30 mg/kg/day.

PERSONAL PROTECTIVE EQUIPMENT:

In industrial situations, concentration values below the TWA value should be maintained. Values may be reduced by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods. If you believe air borne concentrations of mists, dusts or vapours are high, you are advised to modify the process or environment to reduce the problem.

Respirator:

It is usually safe to use the product without a mask or respirator. If the product is used in dusty or confined conditions, a mask or respirator suitable for protection from dusts and mists of pesticides is adequate. Limitations of respirator use specified by the approving agency and the manufacturer must be observed.

Clothing:

Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

Gloves:

Employee must wear appropriate synthetic protective gloves to prevent contact with this substance.

Eye protection:

Wear safety goggles or face shield.

Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain or appropriate alternative within the immediate work area for emergency use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Water Soluble Granules.
Odour:	White
Bulk density:	0.65 ± 0.01 g/cm ³
Solubility in water:	Miscible
Flash point:	None. Does not flash.
pH:	3.0–5.0
Oxidizing properties:	Not oxidizing
Corrosiveness:	Corrosive to galvanized steel and mild steel.

SECTION 10 - STABILITY AND REACTIVITY

Stability:

Stable under normal temperatures and pressures. Glyphosate reacts strongly (possibly violent exothermic reaction) with strong alkalis. Photodecomposition is negligible. Is stable to light and also stable up to 60 °C. Product is unlikely to spontaneously polymerise or decompose. Decompose only after heating to dryness followed by further heating.

Glyphosate may be photolabile in natural waters, with calcium or other metal ions acting as catalysts for the process.

Dilution stability:

Stable in aqueous solutions at 20 °C.

Storage stability:

Stable for 2 years under normal warehouse conditions. Store at temperatures below 50 °C and above -15 °C. Stable to light. Partial crystallization may occur on prolonged storage below -15 °C.

Incompatibility:

Product is relatively stable in neutral, weakly acidic and weakly alkaline media, but reacts strongly (and possibly violently) with strong alkalis. Mixing with other products may reduce the activity of glyphosate. Incompatible with galvanized steel and unlined mild steel materials for storage.

Thermal decomposition:

Toxic oxides of carbon, nitrogen and phosphorus are released when the product decomposes on heating.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute oral LD₅₀:	10740mg/kg in rats.
Acute dermal LD₅₀:	> 4000 mg/kg in rats.
Inhalation:	Technical: LC ₅₀ (4 hours): > 12.2 mg/l.

MATERIAL SAFETY DATA SHEET

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Acute skin irritation:

Not irritating to skin (rabbit). Not skin sensitizer.

Acute eye irritation:

Slightly irritating to eyes (rabbit).

Carcinogenicity:

Animal studies did not detect any carcinogenic effects.

Teratogenicity:

Animal studies did not detect any teratogenic effects.

Mutagenicity:

Animal studies did not detect any mutagenic effects.

Reproductivity:

Reproductive changes in test animals only occur at very high doses. It is unlikely that glyphosate would produce effects in humans.

SECTION 12 - ECOLOGICAL INFORMATION

Degradability:

Glyphosate is moderately persistent in soil, with estimated half-life of 47 days. Microbes are primarily responsible for breakdown. Glyphosate is strongly adsorbed to suspended organic and mineral matter in water, and broken down primarily by microbes. Half-life ranges from 12 days to 10 weeks.

Mobility:

The product is practically immobile. It is strongly absorbed to most soils. It does not leach appreciably, and has low potential for runoff.

Accumulation:

The product shows little or no tendency to bioaccumulate and poses no long term threat to wildlife.

ECOTOXICOLOGY:

Birds: Slightly toxic.

LC ₅₀ (5-day diet):	Mallard duck:	> 4500 mg/kg diet
	Bobwhite quail:	> 4500 mg/kg diet

Fish: Not toxic.

LC ₅₀ (96 hours):	Bluegill sunfish:	> 1000 mg/l
	Trout:	> 1000 mg/l
	Fathead minnows:	97 mg/l

Due to surfactant, GLYPHOSATE 360 is moderately toxic to fish.

Bees: Not toxic.

LD ₅₀ oral & dermal:	> 0.1 mg/bee
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Daphnia:

LC ₅₀ (48 hours):	930 mg/l
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Earthworms:

LC ₅₀ (14 days):	<i>Eisenia foetida</i> :	> 5000 mg/kg soil
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Other Beneficial organisms:

No effect on carabid beetles. Harmless to slightly harmful to green lacewing, parasite species, mites/spiders and insects. Moderately harmful to *Bembidion lampros*.

SECTION 13 - DISPOSAL CONSIDERATION

Pesticide disposal:

Open dumping or burning of this pesticide is prohibited. Waste resulting from the use of this product that cannot be reused or reprocessed. Never pour untreated waste or surplus products into public sewers or where there is any danger of run-off or seepage into water systems. Do not contaminate rivers, dams or any other water sources with the product or used containers. If wastes cannot be used according to label instructions or chemically reprocessed, dispose of in a landfill approved for pesticide disposal or bury under at least 500 mm of soil in a non-crop, non-pasture area away from water sources of homes. Dispose of in accordance with all applicable local and state laws.

Container disposal:

Emptied containers retain vapour and product residues. Observe all labelled safeguards until container is destroyed. Do not re-use the empty container for any other purpose but destroy it by perforation and flattening and bury in an approved dump site. Prevent contamination of food, feedstuffs, drinking water and eating utensils. Comply with local legislation applying to waste disposal.

SECTION 14 - TRANSPORT INFORMATION

UN NUMBER: 3077

Road Transport ADR/IRD:


Class: 9

MATERIAL SAFETY DATA SHEET

Issued by: Arysta Lifescience South Africa

Phone: 031 514 5600

Poison Information Centre: 082 446 8946; Tygerberg: (021) 931 6129; Poison Emergency Enquiry: (021) 689 5227

 Arysta LifeScience	Product Name: Kalach 700 WSG
Page 5 of 5	
Packing group: III Shipping name: Environmentally hazardous substance, solid, N.O.S. (herbicide - glyphosate) Maritime Transport IMDG/IMO: Class: 9 Packing group: III Shipping name: Environmentally hazardous substance, solid, N.O.S. (herbicide - glyphosate) Considered a Marine Pollutant.	
SECTION 15 - REGULATORY INFORMATION	
Symbol: N Indication: Environmentally dangerous substance. Risk phrases: R20/22 Harmful by inhalation or if swallowed R 36 Irritating to eyes. R 52 Harmful to aquatic organisms. R 54 Toxic to flora. Safety phrases: S 2 Keep out of reach children. S 2425 Avoid contact with skin and eyes. S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 61 Avoid release to the environment	
SECTION 16 - OTHER INFORMATION	
Packaging and Labelling: Packed in 10, 15, 50, 100, 430, 500g sachets & 1 kg carton & 5, 10, 15, 20 and 25 kg paper bags or Carton with inner plastic sachet with outer plastic lining, and labelled according to South African regulations and guidelines.	
Disclaimer: The information on this sheet is not a specification; it does not guarantee specific properties. The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage use of the product. It is not applicable to unusual or non-standard uses of the product nor where instructions or recommendations are not followed. All information is given in good faith but without guarantee in respect of accuracy, and no responsibility is accepted for errors and omissions or the consequence thereof.	

Appendix B: Water Quality Analysis Reports

Akumadan Site Borehole Water Quality Analysis for First Quarter of 2020

GHANA WATER COMPANY LIMITED

Main Bankers: Social Security Bank
Ghana Commercial Bank

My Ref. No.:

Your Ref. No.:



Brong Ahafo Region
Post Office Box 88
Sunyani - B/A

17th March, 2020

Attn. FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION

CERTIFICATE OF ANALYSIS

Sample Description: Borehole		
Brand Name: Form Ghana Boreholes		
Country of Origin: Ghana		Expiry date: 17/02/2021
Name of Community: Site → Akumadan		Batch No.
Packaging Type:		

TEST RESULTS

PHYSICO-CHEMICAL ANALYSIS:			DATE OF ANALYSIS: 17/03/2020	
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS
Temperature		°C	-	29.70
pH	Electrometric	-	6.5-8.5	5.38
Residual free chlorine	Colorimetric	mg/l	0.0	0.00
Colour	Platinum-cobalt	Pt.Co	0-15	4.00
Turbidity	Nephelometric	NTU	5	0.00
Conductivity	Electrometric	µs/cm	-	34.00
Total Dissolved Solids	Electrometric	mg/l	1000	17.00
Total Hardness	Titrimetric	mg/l	500	79.00
Calcium Hardness	Titrimetric	mg/l	-	23.00
Magnesium Hardness	Titrimetric	mg/l	-	56.00
Alkalinity	Titrimetric	mg/l	-	14.00
Chloride	Argentometric titration	mg/l	250	8.00
Nitrite	Diazotization	mg/l	3.0	1.00

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Nitrate	Cadmium reduction	mg/l	50	0.50
Ammonia(Nitrogen)	Nessler	mg/l	1.5	0.00
Fluoride	Spands	mg/l	1.5	0.00
Iron	FerroVer	mg/l	0.3	0.00
Sulphate	Sulfaver 4	mg/l	250	0.00
Manganese	Periodate oxidation	mg/l	0.4	0.20
Phosphate	PhasVer 3	mg/l	0.3	0.20
Aluminium	Aluminon method	mg/l	0.2	0.00
Cyanide	Pyridine-pyrazolone	mg/l	0.07	0.00
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00

MICROBIOLOGICAL ANALYSIS:			DATE OF ANALYSIS: 17/03/2020	
PARAMETER	TEST METHOD	UNIT	SPECIFICATION/ METHOD DETECTION LIMIT	RESULTS
				Site
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	<1.1	>8.0
E. Coli	Indole Test	Present/Absent (P/A)	Absent	Absent

REMARKS: The water sample submitted to the laboratory met the standards for all the parameters except pH and fecal coliform. pH correction, and disinfection are recommended.

Note: These results are only applicable to the sample(s) submitted to the laboratory.


JANET W. O. A. MANAGER
ASUBIMA WATER CO. LTD.
ASUBIMA BRONG AKAFO

Regional WQA Manager
 {Janet Atebiya}

Board of Directors: Hon. Alexander K. Afeyo-Markie (Chairman), Ing. Dr. Clifford Brimah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayem, Nana Sigi Gewong, Hon. Kwame Yemasi Angyefo, Mr. Clement Abuzano Kaba, Dr. Forster Kuro-Ankama Sarpong, Madam Maria Abu Lovelace-Johnson, Mr. Alexander K. B. Boney, Mrs. Seyena Kwakye-Mintah

Registered Office: 28th February Road (Near Independence Square)
 Telephone: 233-0302-666781-7 Fax: 233-0302-667552 Telegrams: DIRWAT
 Website: www.qwcl.com.gh E-mail: info@qwcl.com.gh

GHANA WATER COMPANY LIMITED

Main Bankers: Social Security Bank
Ghana Commercial Bank



Bong Ahalo Region
Post Office Box 88
Sunyani - B/A

My Ref. No.:

17th March, 2020

Your Ref. No.:

Attn: FORM GHANA LIMITED, P.O.BOX 211, SUNYANI, BONO-REGION

CERTIFICATE OF ANALYSIS

Sample Description: Borehole	
Brand Name: Form Ghana Boreholes	
Country of Origin: Ghana	Expiry date: 17/02/2021
Name of Community: Asubima/Afrensu (Plantation)	Batch No.
Packaging Type:	

TEST RESULTS

PHYSICO-CHEMICAL ANALYSIS:				DATE OF ANALYSIS: 17/03/2020			
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/ JINI -TS	GHANA STANDARD SPECIFICATION	RESULTS			
				Asubima (Out)	Asubima (In)	Afrensu B. (Out)	Afrensu B. (In)
Temperature		°C	-	29.30	29.20	29.10	29.20
pH	Electrometric	-	6.5-8.5	6.17	6.28	6.24	5.94
Residual free chlorine	Colorimetric	mg/l	0.0	0.00	0.00	0.00	0.00
Colour	Platinum-cobalt	Pt.Co	0-15	10.00	8.00	12.00	10.00
Turbidity	Nephelometric	NTU	5	6.86	5.41	8.40	7.40
Conductivity	Electrometric	µ/cm	-	72.00	57.00	68.00	105.00
Total Dissolved Solids	Electrometric	mg/l	1000	37.00	29.00	35.00	54.00
Total Hardness	Titrimetric	mg/l	500	35.00	57.00	48.00	83.00
Calcium Hardness	Titrimetric	mg/l	-	16.00	18.00	14.00	93.00
Magnesium Hardness	Titrimetric	mg/l	-	19.00	39.00	34.00	30.00
Alkalinity	Titrimetric	mg/l	-	23.00	26.00	24.00	23.00

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Chloride	Argentometric titration	mg/l	250	24.00	20.00	19.00	16.00
Nitrite	Diazotization	mg/l	3.0	4.00	3.00	5.00	5.00
Nitrate	Cadmium reduction	mg/l	50	2.20	2.00	2.50	2.80
Ammonia (Nitrogen)	Nessler	mg/l	1.5	0.00	0.00	0.00	0.00
Fluoride	Spands	mg/l	1.5	0.25	0.28	0.13	0.29
Iron	FerroVer	mg/l	0.3	0.86	0.74	1.19	1.47
Sulphate	Sulfaver 4	mg/l	250	6.00	2.00	4.00	8.00
Manganese	Periodate oxidation	mg/l	0.4	0.20	0.10	0.70	0.30
Phosphate	PhosVer 3	mg/l	0.3	0.22	0.16	0.18	0.23
Aluminium	Aluminon method	mg/l	0.2	0.07	0.04	0.01	0.07
Cyanide	Pyridine-pyrazalane	mg/l	0.07	0.00	0.00	0.00	0.00
Arsenic	2B22800 (E2 arsenic)	mg/l	0.01	0.00	0.00	0.00	0.00

MICROBIOLOGICAL ANALYSIS:				DATE OF ANALYSIS: 17/03/2020			
PARAMETER	TEST METHOD	UNIT	SPECIFICATION -N/ METHOD DETECTION LIMIT	RESULTS			
				Asubima (Out)	Asubima (In)	Afrensu o.B. (Out)	Afrensu B. (In)
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	<1.1	>8.0	8.0	4.6	1.1
E. Coli	Indole Test	Present (P)/Absent(A)	Absent	Absent	Absent	Absent	Absent

REMARKS: All four samples did not meet the standards for pH, turbidity, Iron and Fecal Coliform. Asubima-Out, Afrensu-Out and Afrensu-In all recorded Nitrite levels above the range. Afrensu-Out also recorded manganese levels above the range. Disinfection, pH correction and Iron removal are recommended for all four water sources. Manganese removal is recommended for Afrensu-Out.

Note: These results are only applicable to the sample(s) submitted to the laboratory.

Regional WQA Manager

{Janet Atebiya}

REGIONAL W. Q. A. MANAGER
GHANA WATER CO. LTD.
SONYANI BRONG AHAFO

Board of Directors: Hon Alexander K. Agye-Markin (Chairman), Ing. Dr. Clifford Brinsah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayem, Naba Sigi Gwong, Hon. Kwame Twumasi Anserfo, Mr. Clement Abochuna Kaba, Dr. Forster Kam-Ankama Sarpong, Madam Martha Abo Lovelace-Johnson, Mr. Alexander K. B. Bonney, Mrs. Serena Kwakye-Mintah

Registered Office: 28th February Road, (Near Independence Square)

Telephone: 233-0302-666781-7 Fax: 233-0302-663552 Telegram: DIRWAT

Website: www.gwcl.com.gh E-mail: info@gwcl.com.gh


Akumadan Site Borehole Water Quality Analysis for Second Quarter of 2020

GHANA WATER COMPANY LIMITED

Main Bankers: Social Security Bank
Ghana Commercial Bank

My Ref. No.:

Your Ref. No.:



Brong Ahafo Region
Post Office Box 88
Sunyani - B/A

1st July, 2020

Attn. FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION

CERTIFICATE OF ANALYSIS

Sample Description: Borehole	
Country of Origin: Ghana	
Net Volume: 1.5L	Expiry date; 24/05/2021
Name of Community: Site Akumadan	Batch No.

TEST RESULTS

PHYSICO-CHEMICAL ANALYSIS:			DATE OF ANALYSIS: 24/06/2020	
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS
				Site Akumadan
Temperature		°C	-	29.20
pH	Electrometric	-	6.5-8.5	6.24
Residual free chlorine	Colorimetric	mg/l	0.0	0.00
Colour	Platinum-cobalt	Pt.Co	0-15	5.00
Turbidity	Nephelometric	NTU	5	0.08
Conductivity	Electrometric	µ/cm	-	45.00
Total Dissolved Solids	Electrometric	mg/l	1000	23.00
Total Hardness	Titrimetric	mg/l	500	19.00
Calcium Hardness	Titrimetric	mg/l	-	11.00
Magnesium Hardness	Titrimetric	mg/l	-	8.00
Alkalinity	Titrimetric	mg/l	-	18.00
Chloride	Argentometric titration	mg/l	250	7.00
Nitrite	Diazotization	mg/l	3.0	1.20


2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Nitrate	Cadmium reduction	mg/l	50	2.10
Ammonia(Nitrogen)	Nessler	mg/l	1.5	0.05
Fluoride	Spands	mg/l	1.5	0.36
Iron	FerroVer	mg/l	0.3	0.08
Sulphate	Sulfaver 4	mg/l	250	0.00
Phosphate	PhosVer 3	mg/l	0.3	0.25
Aluminium	Aluminon method	mg/l	0.2	0.01
Cyanide	Pyridine-pyrazalone	mg/l	0.07	0.00
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00

MICROBIOLOGICAL ANALYSIS:			DATE OF ANALYSIS: 24/06/2020	
PARAMETER	TEST METHOD	UNIT	SPECIFICATION/ METHOD DETECTION LIMIT	RESULTS
				Site
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	<1.1	<1.1
E. Coli	Indole Test	Present/Absent (P/A)	Absent	Absent

REMARKS: The water sample submitted to the laboratory met the standards for all the parameters except pH. pH correction is recommended.

Note: These results are only applicable to the sample(s) submitted to the laboratory.


REGIONAL W. Q. A. MANAGER
GHANA WATER CO. LTD.
SUNYANI BRONG AHFO

Regional WQA Manager

{Janet Atebiya}


Board of Directors: Hon Alexander L. Afenyo-Markin (Chairman), Ing. Dr. Clifford Braimah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayisa, Nana Sigi Gwang, Hon. Kwame Tsamasi Anporfo, Mr. Clement Alosebano Kaba, Dr. Forster Kum-Ankama Sarpong, Madam Maria Aha Lovelace-Johnson, Mr. Alexander K. B. Bonney, Mrs. Serem Kwakye-Mintah

Registered Office: 28th February Road, (Near Independence Square)

Telephone: 233-0302-666781-7 Fax: 233-0302-663352 Telegrams: DIRWAT

Website: www.gwcl.com.gh E-mail: info@gwcl.com.gh

Second Quarter Water Quality Analysis for streams in Asubima and Afrensu-Brohuma Forest Reserves

GHANA WATER COMPANY LIMITED							
Main Bankers: Social Security Bank Ghana Commercial Bank				Brong Ahafo Region Post Office Box 88 Sunyani – BIA			
My Ref. No.:				1st July, 2020			
Your Ref. No.:							
Attn: FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION							
CERTIFICATE OF ANALYSIS							
Sample Description: Boreholes					Expiry date: 19/05/2021		
Country of Origin: Ghana							
Net Volume: 1.5L Each							
Name of Community:							
TEST RESULTS							
PHYSICO-CHEMICAL ANALYSIS:				DATE OF ANALYSIS: 19/06/2020			
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS			
				Asubima DS	Asubima US	Afrenso/ Brohuma US	Afrenso/ Brohuma DS
Temperature		°C	-	29.20	29.20	29.20	29.20
pH	Electrometric	-	6.5-9.0	6.70	6.70	6.55	6.52
Colour	Platinum-cobalt	Pt.Co	-	15.00	35.00	15.00	65.00
Turbidity	Nephelometric	NTU	75.0	2.36	4.15	2.01	6.24
Conductivity	Electrometric	µ/cm	1500.0	70.00	89.00	65.00	58.00
Total Dissolved Solids	Electrometric	mg/l	-	36.00	46.00	33.00	30.00
Total Hardness	Titrimetric	mg/l	-	19.00	72.00	23.00	20.00
Calcium Hardness	Titrimetric	mg/l	-	14.00	37.00	11.00	10.00
Magnesium Hardness	Titrimetric	mg/l	-	5.00	35.00	12.00	10.00
Alkalinity	Titrimetric	mg/l	-	27.00	38.00	27.00	24.00
Chloride	Argentometric titration	mg/l	-	11.00	9.00	9.00	11.00
Nitrite	Diazotization	mg/l	-	2.40	1.29	2.01	1.20

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Nitrate	Cadmium reduction	mg/l	-	6.20	4.56	5.21	4.56
Ammonia(Nitrogen)	Nessler	mg/l	1.0	0.30	0.21	0.18	0.07
Fluoride	Spands	mg/l	10.0	0.18	0.00	0.20	0.00
Iron	FerroVer	mg/l	-	1.92	3.82	1.99	5.24
Sulphate	Sulfaver 4	mg/l	-	8.00	24.00	8.00	31.00
Phosphate	PhosVer 3	mg/l	-	0.22	0.18	0.24	0.20
Aluminium	Aluminon method	mg/l	-	0.02	0.15	0.05	0.01
Cyanide	Pyridine-pyrazalone	mg/l	0.07	0.00	0.00	0.00	0.00
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00	0.00	0.00	0.00

MICROBIOLOGICAL ANALYSIS:				DATE OF ANALYSIS: 19/06/2020			
PARAMETER	TEST METHOD	UNIT	SPECIFICATION / METHOD DETECTION LIMIT	RESULTS			
				Asubima DS	Asubima US	Afrenso/ Brohuma US	Afrenso/ Brohuma DS
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	-	>8.0	>8.0	>8.0	>8.0
E. Coli	Indole Test	Present /Absent (P/A)	-	Present	Present	Present	Present

REMARKS:

Note: These results are only applicable to the sample(s) submitted to the laboratory.

DS Downstream

US Upstream

Regional WQA Manager
{Janet Achiya}



REGIONAL W. Q. A. MANAGER
GHANA WATER CO. LTD,
SUNYANI BRONG AHAKO

Board of Directors: Hon Alexander K. Afenyo-Markin (Chairman), Ing. Dr.Clifford Brainah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayisa, Nana Sigm Gbewong, Hon. Kwame Tsamasi Anzorfo, Mr. Clement Abovedano Kaba, Dr. Forster Kam-Akama Sarpong, Madam Maria Abu Lovelace-Johnson, Mr. Alexander K.B. Boany, Mrs. Serena Kwahye-Mintah

Registered Office: 28th February Road, (Near Independence Square)

Telephone: 233-0302-666781-7 Fax: 233-0302-663552 Telegrams: DIRWAT

Website: www.gwcl.com.gh E-mail: info@gwcl.com.gh


Akumadan Site Borehole Water Quality Analysis for Third Quarter of 2020

GHANA WATER COMPANY LIMITED

Main Bankers: Social Security Bank
Ghana Commercial Bank

My Ref. No.:.....

Your Ref. No.:.....



Brong Ahafo Region
Post Office Box 88
Sunyani - B/A

30th September, 2020

Attn. FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION

CERTIFICATE OF ANALYSIS

Sample Description: Borehole	
Country of Origin: Ghana	
Net Volume: 1.5L	Expiry date: 28/09/2021
Name of Community: Site Akumadan	Batch No.

TEST RESULTS

PHYSICO-CHEMICAL ANALYSIS:			DATE OF ANALYSIS: 28/09/2020	
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS
				Akumadam
Temperature		°C	-	27.30
pH	Electrometric	-	6.5-8.5	5.82
Residual free chlorine	Colorimetric	mg/l	0.0	0.00
Colour	Platinum-cobalt	Pt.Co	0-15	7.00
Turbidity	Nephelometric	NTU	5	0.48
Conductivity	Electrometric	µs/cm	-	34.00
Total Dissolved Solids	Electrometric	mg/l	1000	17.00
Total hardness	Titrimetric	mg/l	500	68.00
Calcium Hardness	Titrimetric	mg/l	-	8.00
Magnesium Hardness	Titrimetric	mg/l	-	60.00
Alkalinity	Titrimetric	mg/l	-	16.00
Chloride	Argentometric titration	mg/l	250	13.00
Nitrite	Diazotization	mg/l	2.0	0.50
Nitrate	Cadmium reduction	mg/l	50	0.25

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Ammonia(Nitrogen)	Nessler	mg/l	1.5	0.10
Fluoride	Spands	mg/l	1.5	0.62
Iron	FerroVer	mg/l	0.3	0.12
Sulphate	Sulfaver 4	mg/l	250	0.00
Phosphate	PhosVer 3	mg/l	0.3	1.23
Aluminium	Aluminon method	mg/l	0.2	0.03
Cyanide	Pyridine-pyrazolone	mg/l	0.07	0.01
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00

MICROBIOLOGICAL ANALYSIS:			DATE OF ANALYSIS: 28/09/2020	
PARAMETER	TEST METHOD	UNIT	SPECIFICATION/ METHOD DETECTION LIMIT	RESULTS
				Site
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	<1.1	<1.1
E. Coli	Indole Test	Present/Absent (P/A)	Absent	Absent

REMARKS: The water sample submitted to the laboratory met the standards for all the parameters except pH and Phosphate. pH correction and Phosphate removal are recommended.

Note: These results are only applicable to the sample(s) submitted to the laboratory.


REGINALD W. Q. A. MANAGER
 GAMA WATER CO. LTD.
 SUNYANI BRONG AHMAFO

Regional WQA Manager

{Janet Anebiya}

Board of Directors: Hon Alexander K. Afenyo-Markku (Chairman), Ing. Dr.Clifford Bralimah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayem, Nana Sigi Gesong, Hon. Kwame Tsamasi Ampofo, Mr. Clement Alosehano Kaba, Dr. Forster Kum-Ankuma Sarpong, Madam Maria Aha Lovelace-Johnson, Mr. Alexander K. B. Bonney, Mrs. Serina Kwakye-Mintah

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Website: www.gwcl.com.gh E-mail: info@gwcl.com.gh

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves


Third Quarter Water Quality Analysis for streams in Asubima and Afrensu-Brohuma Forest Reserves

GHANA WATER COMPANY LIMITED

Main Bankers: Social Security Bank
Ghana Commercial Bank

My Ref. No.:.....

Your Ref. No.:.....



Brong Ahafo Region
Post Office Box 88
Sunyani - B/A

30th September, 2020

Attn: FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION

CERTIFICATE OF ANALYSIS

Sample Description: Boreholes	Expiry date: 28/09/2021
Country of Origin: Ghana	
Net Volume: 1.5L Each	
Name of Community:	

TEST RESULTS

PHYSICO-CHEMICAL ANALYSIS:				DATE OF ANALYSIS: 28/09/2020			
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS			
				Asubima US	Asubima DS	Afrenso/ Brohuma US	Afrenso/ Brohuma DS
Temperature		°C	-	27.30	27.30	27.30	27.30
pH	Electrometric	-	6.0-9.0	6.51	6.37	6.27	6.25
Colour	Platinum-cobalt	Pt.Co	0-200.00	25.00	20.00	25.00	27.00
Turbidity	Nephelometric	NTU	0-75.00	37.11	8.12	9.86	14.72
Conductivity	Electrometric	µ/cm	1500	46.00	42.00	52.00	46.00
Total Dissolved Solids	Electrometric	mg/l	1000	23.00	22.00	26.00	24.00
Total Hardness	Titrimetric	mg/l		23.00	21.00	36.00	29.00
Calcium Hardness	Titrimetric	mg/l	-	19.00	9.00	30.00	15.00
Magnesium Hardness	Titrimetric	mg/l	-	4.00	12.00	6.00	14.00
Alkalinity	Titrimetric	mg/l	0-150.00	24.00	20.00	45.00	28.00
Chloride	Argentometric titration	mg/l	0-250.00	10.00	20.00	29.00	18.00
Nitrite	Diazotization	mg/l	-	2.60	1.31	2.06	1.89

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves


Nitrate	Cadmium reduction	mg/l	0-50.00	8.25	4.00	4.25	3.75
Ammonia (Nitrogen)	Nessler	mg/l	0-1.00	0.20	0.08	0.13	0.03
Fluoride	Spanid	mg/l	0-10.00	0.56	0.50	0.66	0.51
Iron	FerroVer	mg/l	-	1.48	0.92	1.27	0.89
Sulphate	Sulfaver 4	mg/l	-	32.50	7.50	37.0	7.50
Phosphate	PhosVer 3	mg/l	-	3.32	2.00	2.28	3.05
Aluminium	Aluminon method	mg/l	-	0.08	0.04	0.036	0.03
Cyanide	Pyridine-pyrazolone	mg/l	0.02	0.01	0.01	0.01	0.01
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00	0.00	0.00	0.00

MICROBIOLOGICAL ANALYSIS:				DATE OF ANALYSIS: 28/09/2020			
PARAMETER	TEST METHOD	UNIT	SPECIFICATION / METHOD DETECTION LIMIT	RESULTS			
				Asubima US	Asubima DS	Afrensu/ Brohuma US	Afrensu/ Brohuma DS
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	>	>8.0	>8.0	>8.0	>8.0
E. Coli	Membrane Filter Technique	Present / Absent (P/A)	-	Present	Present	Present	Present

REMARKS:

Note: These results are only applicable to the sample(s) submitted to the laboratory.

Regional WQA Manager
(Janet Atebiya)



REGIONAL W. Q. A. MANAGER
GHANA WATER CO. LTD.
SINYANI BRONG AFOFO

Board of Directors: Hon. Alexander K. Aferjo-Markin (Chairman), Ing. Dr. Clifford Brimah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayem, Nana Sigi Gbewong, Hon. Kwame Tsammiel Amponsah, Mr. Clement Ainselano Kaba, Dr. Fawyer Kum-Ankama Sarpong, Madam Maria Abu Lovelace-Johnson, Mr. Alexander K. B. Bonney, Mrs. Serena Kwakye-Mintah

Registered Office: 28th February Road, (Near Independence Square)

Telephone: 233-0302-666781-7 Fax: 233-0302-665552 Telegram: DIRWAT

Website: www.gwcl.com.gh E-mail: info@gwcl.com.gh

Akumadan Site Borehole Water Quality Analysis for Fourth Quarter of 2020

GHANA WATER COMPANY LIMITED

Main Bankers: Social Security Bank
Ghana Commercial Bank



Brong Ahafo Region
Post Office Box 88
Sunyani - B/A

My Ref. No.:

16th December, 2020

Your Ref. No.:

Attn. FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION

CERTIFICATE OF ANALYSIS

Sample Description: Borehole	
Country of Origin: Ghana	
Net Volume: 1.5L	Expiry date; 16/12/2021
Name of Community: Site Akumadan	Batch No.

TEST RESULTS

PHYSICO-CHEMICAL ANALYSIS:				DATE OF ANALYSIS: 16/12/2020
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS
				Akumadan Site
Temperature		°C	-	29.30
pH	Electrometric	-	6.5-8.5	5.92
Residual free chlorine	Colorimetric	mg/l	0.0	0.00
Colour	Platinum-cobalt	Pt.Co	0-15	5.00
Turbidity	Nephelometric	NTU	5	0.00
Conductivity	Electrometric	µs/cm	-	37.00
Total Dissolved Solids	Electrometric	mg/l	1000	19.00
Total Hardness	Titrimetric	mg/l	500	8.00
Calcium Hardness	Titrimetric	mg/l	-	6.00
Magnesium Hardness	Titrimetric	mg/l	-	2.00
Alkalinity	Titrimetric	mg/l	-	26.00
Chloride	Argentometric titration	mg/l	250	8.00
Nitrite	Diazotization	mg/l	3.0	0.00
Nitrate	Cadmium reduction	mg/l	50	3.50

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Ammonia(Nitrogen)	Nessler	mg/l	1.5	0.30
Fluoride	Spands	mg/l	1.5	0.41
Iron	FerroVer	mg/l	0.3	0.01
Sulphate	Sulfaver 4	mg/l	250	0.00
Phosphate	PhosVer 3	mg/l	0.3	1.12
Aluminium	Aluminon method	mg/l	0.2	0.07
Cyanide	Pyridine-pyrazalone	mg/l	0.07	0.00
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00

MICROBIOLOGICAL ANALYSIS:				DATE OF ANALYSIS: 15/12/2020	
PARAMETER	TEST METHOD	UNIT	SPECIFICATION/ METHOD DETECTION LIMIT	RESULTS	
				Site	
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	<1.1	<1.1	
E. Coli	Indole Test	Present/Absent (P/A)	Absent	Absent	

REMARKS:

Note: These results are only applicable to the sample(s) submitted to the laboratory.

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Regional WQA Manager

{Janet Atebiya}

Board of Directors: Hon Alexander K. Afejo-Markin (Chairman), Ing. Dr. Clifford Brimah (Managing Director), Mr. Joseph Obeng-Poku, Mr. Michael Ayew, Naba Sigi Gewong, Hon. Kwame Twumasi Ampofo, Mr. Clement Alosebano Kaba, Dr. Forster Kum-Aukuma Sarpoug, Madam Maria Abo Lovelace-Johnson, Mr. Alexander K. B. Bonney, Mrs. Serena Kwakye-Mintah
 Registered Office: 28th February Road, (Near Independence Square)
 Telephone: 233-0302-666781-7 Fax: 233-0302-663552 Telegrams: DIRWAT
 Website: www.gwcl.com.gh E-mail: info@gwcl.com.gh

2020 Annual Environmental Report for Asubima and Afrensu Brohuma Forest Reserves

Fourth Quarter Water Quality Analysis for streams in Asubima and Afrensu-Brohuma Forest Reserves

GHANA WATER COMPANY LIMITED								
Main Bankers: Social Security Bank Ghana Commercial Bank					Brong Ahafo Region Post Office Box 88 Sunyani - B/A			16th December, 2020
My Ref. No.:								
Your Ref. No.:								
Attn. FORM GHANA LIMITED, P.O.BOX 211 SUNYANI, BONO-REGION								
CERTIFICATE OF ANALYSIS								
Sample Description: Boreholes					Expiry date: 16/12/2021			
Country of Origin: Ghana								
Net Volume: 1.5L Each								
Name of Community:								
TEST RESULTS								
PHYSICO-CHEMICAL ANALYSIS:				DATE OF ANALYSIS: 16/12/2020				
PARAMETER	TEST METHOD	METHOD DETECTION LIMIT/UNITS	GHANA STANDARD SPECIFICATION	RESULTS				
				Asubima US	Asubima DS	Afrenso/ Brohuma US	Afrenso/ Brohuma DS	
Temperature		°C	-	29.50	29.50	29.60	29.70	
pH	Electrometric	-	6.0-9.0	6.21	6.17	6.11	6.00	
Colour	Platinum-cobalt	Pt.Co	0-200.00	30.00	15.00	15.00	20.00	
Turbidity	Nephelometric	NTU	0-75.00	17.47	9.22	9.72	13.96	
Conductivity	Electrometric	µs/cm	1500	38.00	38.00	52.00	46.00	
Total Dissolved Solids	Electrometric	mg/l	1000	20.00	19.00	26.00	24.00	
Total Hardness	Titrimetric	mg/l		22.00	18.00	24.00	14.00	
Calcium Hardness	Titrimetric	mg/l	-	12.00	8.00	8.00	12.00	
Magnesium Hardness	Titrimetric	mg/l	-	10.00	10.00	16.00	2.00	
Alkalinity	Titrimetric	mg/l	0-150.00	30.00	29.00	39.00	36.00	
Chloride	Argentometric titration	mg/l	0-250.00	8.00	18.00	15.00	12.00	
Nitrite	Diazotization	mg/l	-	6.00	4.02	3.00	3.00	

2020 Annual Environmental Report for Asubima and Afrenso Brohuma Forest Reserves

Nitrate	Cadmium reduction	mg/l	0-50.00	3.00	1.90	2.50	2.60
Ammonia(Nitrogen)	Nessler	mg/l	0-1.00	0.25	0.12	0.15	0.12
Fluoride	Spands	mg/l	0-10.00	0.71	0.67	0.66	0.54
Iron	FerroVer	mg/l	-	0.84	0.58	1.07	0.73
Sulphate	Sulfaver 4	mg/l	-	3.00	2.00	3.00	2.00
Phosphate	PhosVer 3	mg/l	-	4.52	2.23	1.83	2.19
Aluminium	Aluminon method	mg/l	-	0.04	0.05	0.05	0.04
Cyanide	Pyridine-pyrazalone	mg/l	0.07	0.00	0.00	0.00	0.00
Arsenic	2822800(EZ arsenic)	mg/l	0.01	0.00	0.00	0.00	0.00

MICROBIOLOGICAL ANALYSIS:				DATE OF ANALYSIS: 15/12/2020			
PARAMETER	TEST METHOD	UNIT	SPECIFICATION / METHOD DETECTION LIMIT	RESULTS			
				Asubima US	Asubima DS	Afrenso/Brohuma US	Afrenso/Brohuma DS
Fecal coliform	Multiple tube fermentation	MPN Index/ 100mL	-	>8.0	>8.0	>8.0	>8.0
E. Coli	Membrane Filter Technique	Present / Absent (P/A)	-	Present	Present	Present	Present

REMARKS:

Note: These results are only applicable to the sample(s) submitted to the laboratory.

Regional WQA Manager
{Janet Atebiya}

Board of Directors: Hon Alexander K. Afenyo-Mankin (Chairman), Ing. Dr.Clifford Brumah (Managing Director), Mr.Joseph Obeng-Poku, Mr.Michael Ayesu, Naaba Sigr Gewong, Hon. Kwame Twumasi Aumofa, Mr. Clement Alosebuno Kaba, Dr. Forster Kum-Ankama Sarpong, Madam Maria Aba Lovelace-Johnson, Mr.Alexander K.B. Bonney, Mrs.Serena Kwakye-Mintah
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Telephone: 233-0302-666781-7 Fax: 233-0302-663552 Telegrams: DIRWAT
Website: www.qwcl.com.gh E-mail: info@qwcl.com.gh

DECLARATION:

I _____ hereby declare that the information provided on this form is true to the best of my knowledge and shall provide any additional information that shall come to my notice in the course of processing this application.

Signature _____ Date _____