ANNEX J

LIVELIHOODS STUDY OF FARMERS IN NEWMONT CONCESSION BRONG AHAFO REGION

QUESTIONNAIRE

COMMUNITY/COTTAGE:————————————————————————

DISTRICT: ————————————————————————

INTERVIEWER: ————————————————————————

SUPERVISOR: ————————————————————————

NAME OF RESPONDENT: ————————————————————Male Female ☐

ID Number ———————————— Enumeration Area————————————

DATE: ————————————————————————

TIME OF INTERVIEW: START…… END……

Circle the number attached to the appropriate response (Multiple choices are allowed)

1.0 HOUSEHOLD IDENTIFICATION	
1.1	Household head's full name…… 1. PRESENT [ ] 2.ABSENT [ ]
1.2	Household's head ethnicity (TICK as appropriate) from the following
	1. Akyem 2. Fanti 3. Gruni / Frafra 4. Konkomba 5. Kusasi 6. Dagaari 7. Kasem / Nankam 8. Asanti 9. Ewe 10. Ga - Adangbe 6. Mole – Dagomba 7. Gonja
1.3	Location:
1.4	

	How long in (years) has the household been in this location: 1. **Less than 1 year [ ]** 2. **1- 10 [ ]** 3. **> 10 years [ ]**
1.5	If less than 1year, where did household move from (give place name)……

2.0 CATEGORY AFFECTED

2.1 Please describe your household's relationship to the affected area (more than one option possible)

1. Own farmland within the area [ ]
2. Own farmland and cultivating it by self [ ]
3. Own farm land within the area and hire/lease it to somebody [ ]
4. Hire / Rent land within the affected area from somebody [ ]
5. Have leasehold over land in the affected area [ ]
6. Sharecrop within the affected area [ ]
7. Work for somebody who owns land within the affected area [ ]

2.1.1 if you own land, which is hired/leased to somebody, please provide details as below:

Name of Person(s) using land	**Nature of tenure –** 1 Lease 2 share crops 3Abusa/Abunu	**Duration of agreement**	**How long has the agreement been in place**	**Size of land (acres or poles)**

2.1.2 if your use land which belongs to somebody, please provide details as below:

Name of landowner	**Nature of tenure –** 1 Lease 2 share crops 3Abusa/Abunu	**Duration of agreement / lease**	**How long has the agreement been in place**	**Size of land (acres or poles)**

2.2 ACCESS TO LAND OUTSIDE CONCESSION

2.2.1 Do you own land elsewhere outside the concession area within the Birim North District? 1. Yes 2. No.

State where (if yes)
.....
2.2.2 Do you own land outside Birim North District? 1. Yes 2. No.

State where (if yes).....

A - HOUSEHOLD ACTIVITIES AND FOOD PRODUCTION		
A1.	What is your main income generating activity	1. Farming 2. Hired farm hand (by day) 3. Caretaker farmer 4. Trading 5. Teaching 6. Artisan 7. Retired 8. Other (specify) ————
A2.	How many years have you been working in the Akyem area?	————————Years
A3.	How many years have you spent in your current job	————————years
A4.	Have you ever worked or possess any skill in any of the following areas?	1. Driving 2. Operation of equipment of any kind 3. Mechanical skills 4. Electrical skills 5. Electronic skills 6. Plumbing 7. Masonry 8. Carpentry 9. Warehousing/store keeping skills 10. Administrative/clerical skills 11. Any industrial experience **12. Other (specify)**

A5. Does your household have household farm? 1. Yes (Ask about sharecropping / leasing) 2. No (go to A7)
A6. If Yes, who owns the farmland?
A7. How long have you been farming in the current location?

A8. How many farms do you have and which crops are on each farm?	1. 2. 3. 4. 5. More than 5

FARM SIZE	DISTANCE FROM HOMETOWN	TYPE OF OWNERSHIP	AFFECTED BY PROJECT	TYPE OF LABOUR	OUTPUT		
					CROP	QTY OF HARVEST	QTY SOLD
1. 1 – 2 ac 2. 2 – 4 ac 3. > 4 ac	1. 0 – 1 km 2. 1 – 4 km 3. 5 – 8 km 4. > 8 km	1. Freehold 2. On rent 3. Share cropping 4.Others: ……	1. Yes 2. No	1. Family 2. Hired 3. Neigbour 4. Other(s): ……			
A 9 (farm 1)							
A 10 (farm 2)							
A 11(farm 3)							
A 12 (farm 4)							
A 13 (farm 5)							

A14. What crops do you grow on your farm/ household farm?	A15. Where do you store the crops after harvesting?	A16. What crop protection method do you use?	A17. What storage Structures do you use?	A18. Did you sell part of the harvest last year?	A19. When did you sell most of your harvest?	A20. For what purpose did you sell the harvest?
Cereals and grains 1. Yes 2. No → go to next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem, acheapong leave etc) 2. Chemicals- (actellic etc) 3. Ash 4. Drying 5. Other 6. None	1. Barns 2. Mud silos 3. Crib 4. Sacks / bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No → Go to next crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Roots/Tubers 1. Yes 2. No → go to next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. None	1. Barns 2. Mud silos 3. Crib 4. Sacks /bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No → go to next crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other

Legumes 1. Yes 2. No go to → next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. None	1. Barns 2. Mud silos 3. Crib 4. Sacks /bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No go to next → crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Vegetables 1. Yes 2. No go to → next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. None	1. Barns 2. Mud silos 3. Crib 4. Sacks /bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No → go to next crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Fruits 1. Yes 2. No go to → next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. None	1. Barns 2. Mud silos 3. Crib 4.Sacks/bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No go to next → crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Cocoa 1. Yes 2. No go to → next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. 4. None	1. Barns 2. Mud silos 3. Crib 4. Sacks /bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No → go to next crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul – Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Plantain 1. Yes 2. No go to → next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. 4. None	1. Barns 2. Mud silos 3. Crib 4. Sacks /bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No → go to next crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Oil Plam 1. Yes 2. No go to → next crop	1. On the farm 2. In the house 3. Do not store → go to A18	1. Plant materials (neem etc) 2. Chemicals- (actellic etc) 3. Other 4. 4. None	1. Barns 2. Mud silos 3. Crib 4. Sacks /bags 5. Floor of room 6. Basins 7. Other	1. Yes 2. No → go to next crop	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul – Aug	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other

B - HOUSEHOLD ANIMALS PRODUCTION

B1 Does your household own animals?
Yes
2. No go to next section

B2 What animals does your household own?	B3 Currently How many animals do you have?	B4 Where do you keep your animals during the day?	B5 Did your household sell any animals last year?	B6 what period did your household sell the animals?	B7 How many animals did you sell?	B8 For what purpose did you sell the animals?
Poultry 1. Yes 2. No → go to next animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 1. No → go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul – Aug		1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Grasscutter 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	2. Yes 2. No → go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug		1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Goats 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 2. No go to next animal	1. Oct – Dec → 2. Jan – Mar 3. Apr – June 4. Jul – Aug		1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Sheep 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 2. No go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	→	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other

Pigs 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 2. No go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	→	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Cattle 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 2. No go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	→	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Snails 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 2. No go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	→	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
Other 1. Yes 2. No → go to next Animal		1. Free range 2. Animal house 3. On farm 4. Other	1. Yes 2. No go to next animal	1. Oct – Dec 2. Jan – Mar 3. Apr – June 4. Jul - Aug	→	1. Food 2. Agric. Input 3. Medical care 4. Education 5. Cloth 6. Soup ingredients 7. Personal 8. Funeral 9. Other
B9 How did the number of your livestock compare to the number a year ago?						1. Less now 2. Same now 3. More now 4. Don't know

C -TECHNICAL ASSISTANCE ON FARM	
C1. Have you or any member of your household receive technical assistance on your farms over the past three years?	1. Yes 2. No go to next section
C2. If Yes what is the nature of the technical assistance?	1. Extension services 2. Seed 3. Fertilizer 4. Credit 5. Market Access 6. Other farm inputs
C3. What organisation or institution provided the technical assistance on your farm?	1. MOFA 2. ADRA 3. GOPDC 4. Cocoa Research Institute 5. Mponua Rural Bank 6. Asuopra Rural Bank 7. Other special Packages
C4. List members of your household who received technical assistance	1. 2. 3. 4. 5.
C5. How often is the Technical assistance provided?	1. Regular 2. Irregular 3. A special one off package

D - PRODUCE MARKETING		
D1	Where do you sell most of your crops/animals?	1. Not sold 2. On-farm/Farm gate 3. Off-farm – mention any of the Akyem markets 4. Off-farm - markets outside the district 5. Off-farm specify markets within district …… 6. On and off-farm ……
D2	What is the distance between your farm and where the majority of your crops/animals are sold?	1. Less than ½ km 2. From ½ to 1 km 3. From 1 to 3 km 4. From 3 to 5 km 5. From5 to 10 km 6. 10 km or more
D3	How much time does it take you to transport your crops/animals to the place where the majority are sold?	1. Less than 1 hour 2. From 1 to 3 hours 3. From 3 to 6 hours 4. 6 hours or more
D4	What is the principal mode of transportation used to take your crops/animals to where they are sold?	1. On foot 2. Cart 3. Animal drawn cart 4. Public transport 5. Other (specify)
D5	During the last year how much did you pay to transport your crops/animals to the market?	¢……

D6	Who bought your crops from you?	1. Individuals in Abirem / Afosu 2. Traders at a New Abirem market 3. Traders from outside the District 4. Co-operative Association at Abirem / Afosu. 5. Agricultural Producers Council 6. Community members 7. Other (specify)……
D7	List the household member(s) who take your	1.

	crops/animals to the place where the majority are sold?	2. 3. 4.
D8	Where do you obtain information about prices at which you sell your crops/animals?	1. Buyers 2. Extension services 3. Radio 4. TV 5. Newspaper 6. Neigbours 7. Household members 8. Input distributor/store 9. Community members 10. Other (specify)
D9	Did you save part of your harvest last year for sale later when prices are higher	1. Yes 2. No

E. HOUSEHOLD INCOME, SAVINGS & EXPENDITURE (MONTHLY / ANNUALLY)

SOURCE OF INCOME	METHOD/AVENUE	AMOUNT IN CEDIS
1.1 Agriculture	Food crops e.g. vegetables, fruit sales	
	Livestock	
	Palm oil production	
	Citrus	
	Kola	
	Others (specify) ……	
1.2 Employment (Non farm)	• Self-employment: petty trading, hairdresser, seamstress, carpenter, masonry, driving, sale of provisions, etc.	
	• Small scale mining (galamsey)	
	• Remittance from family / other relations	
	• Property inheritance e.g. Cocoa	
	• Sold labour	
1.3 Migrant remittances/transfers from other households	From elsewhere in Ghana	
	From abroad (specify)	
1.4 Pensions, Allowances, social welfare, and insurance payments		
1.5 Housing and land rent		
1.6 Cash benefit from any group membership		
1.7 Receipt of grant (if any) 1.8 Other income sources (Specify)		**TOTAL:**

2.0	**SAVINGS & FINANCIAL ASSISTANCE**		
2.1	Does your household have cash savings?	1. Yes Bank [ ] Home [ ]	2.No Give reasons ……

2.2	Does your household currently have a loan? (Cash)	1. Yes 2. No If yes, state specific facility 1. Bank 2. Private individual 3. Group membership 4. District Assembly 4. NGO (name)…… 5. Other (specify please)……..
2.3	Does your household benefit from any agricultural support scheme?	1. Yes (Specify) e.g. Palm seedlings, fertilizer, or other farm inputs…… …… 2. No
2.4	3 Name Organization that granted you the above facility (e.g. GOPDC) ……	
2.5	State if it is a free donation or for a contract term ……	
2.6	State amount payable ……	
2.7	State current balance of bank loan or credit facility in terms of cash ……	

E - EXPENDITURE ON FARM INPUTS

E 3	Did you use improved or certified seed during planting?	1. Yes 2. No		
E 4	Where did you obtain the improved or certified seeds/seedlings?	1. Market 2. Store 3. Neighbours 4. NGO 5. Extension Officer 6. Other (specify		
E5	For which crops did you use improved or certified seeds/seedlings as planting material?	Crop		Amount purchased
E 6	Did you use some local seeds/planting materials on your farm/	1. Yes 2. No		
E 7	How much did you spend on local seeds/planting materials?	Crop	Amount from own farm	Amount purchased
E 8	Did you use any chemical fertilizer on your farm?	1. Yes 2. No GO TO E9		
E 9	How much did you spend on chemical fertilizer last year?	¢……		

E 10	Where did you obtain your fertilizer?	1. Market 2. Store 3. Neighbours 4. NGO 5. Extension Officer

		6. Other (specify)
E 11	Did you use any fungicides, herbicides or pesticides on your farm?	1. Yes 2. No
E 12	How much did you spend on fungicides, herbicides or pesticides last year?	¢.....
E 13	Where did you obtain your fungicides, herbicides or pesticides?	1. Market 2. Store 3. Neighbours 4. NGO 5. Extension Officer 6. Other (specify)
E 14	During the last year, did you pay hired labourers to work on your farm?	1. Yes 2. No

State the number of people used for each of the following activities and the number of days each activity lasted

	Activity	No. of people		No. of days
		No. of Males	No. of Females	
E 15	Preparing the land			
E 16	Sowing			
E 17	Hilling, weeding and/or pruning			
E 18	Harvesting			
E 19	Other activities related to crops			
E 20	On the average, how much did you pay for a daily wage?			¢.....
E 21	Did the daily wage include food?			1. Yes 2. No
E 22	How much did you spend renting (chain saw operators, spraying machine or any other farm machinery) to prepare your farm or harvest?			¢.....

E 23	Have you paid another person in cash for rent (use of land)?			1. Yes 2. No
E 24	How much did you pay during the last year?	Amount ¢.....	Time Period	No. of payments
			1. Per season	
			2. Per annum	
			3. Other (specify)	

F - OTHER HOUSEHOLD EXPENDITURES

F1	On the average, how much did your household spend on food?	¢..... per day ¢..... per week ¢..... to the next market day
F2	How much did you spend on Children's education last year	1. Enrolment fees ¢..... 2. Tuition and boarding fees ¢..... 3. School lunches ¢..... 4. School books and materials ¢.....
F3	In the last year, did you make any expenditure on clothes for members of your household?	1. Yes 2. No GO TO F5
F4	Approximately, how much was spent?	1. ¢..... 2. Don't remember
F5	In the past month how much did you spend on	1. Detergents, soap for clothing ¢..... 2. Refreshments, alcoholic beverages ¢..... 3. Toilet soap, toothpaste etc. ¢..... 4. Electricity ¢..... 5. Kerosene and other fuels ¢..... 6. Repair of farm implements ¢.....
F6	In the last year, how much did you spend on	1. Furniture for the home ¢..... 2. Radio, TV or electronic equipment ¢..... 3. Plates, pots, silverware, towels, sheets etc. ¢..... 4. Repairs to improve housing ¢..... 5. Parties, festivals, marriages, funerals etc. ¢.....
F7	Did you have expenditures for the purchase of fuel, repairs, replacement parts for agricultural machines?	1. Yes 2. No

F8	How much did you spend in total?	¢.....
F9	Did you have expenditures for the purchase of tools/agricultural machines?	1. Yes 2. No
F10	How much did you spend in total?	¢.....
F11	Did you rent out machinery, equipment or other farm inputs?	1. Yes 2. No

G – OTHER HOUSEHOLD ASSETS		
G1	Does the household or a household member own the house? If 1, go to G2, otherwise go to G3	1. Owns the dwelling 2. Rents the dwelling 3. Uses without paying rent 4. Nomadic or temporary dwelling
G2	Who in the household owns the house?	1. Female spouse 2. Male spouse 3. Female child 4. Male child 5. Female relative 6. Male relative 7. Other male 8. Other female
G3	How many separate rooms are there in your house?	
G4	Is there a kitchen in the house?	1. Yes 2. No
G5	How many rooms are there in the kitchen building?	
G6	How many hectares / poles of land are owned by the household? (with one decimal, e.g. 24.7)	
G7	Do you own any other house outside the residence described above?	
G8	State where it is if within concession area:	
G9	How does the amount of land owned compare with one year ago?	1. Less now 2. Same now 3. More now 4. Don't know
G10	Does the household own any of the following? Include items only if they are in working condition	1. Electric iron 2. Refrigerator 3. Television 4. Mattress or bed 5. Radio 6. Watch or clock 7. Sewing machine 8. Modern stove 9. Bicycle 10. Motorcycle 11. Car or truck
G11	Does the household have electricity?	1. Yes 2. No
G12	How often in the last year did you have problems satisfying the food needs of the household?	1. Never 2. Sometimes 3. All the times
G13	How do you compare the overall economic situation of the HOUSEHOLD with one year ago?	1. Much worse now 2. A little worse now 3. Same 4. A little better now

		5. Much better now 6. Don't know
G14	How do you compare the overall economic situation of the COMMUNITY with one year ago?	1. Much worse now 2. A little worse now 3. Same 4. A little better now 5. Much better now 6. Don't know

H - HOUSEHOLD FOOD SECURITY

H1	Did your last season harvest take you through the year?	1. Yes go to H7 → 2. No
H2	Why did you not produce enough?	1. FLOOD/HEAVY RAINS PREVENTED EARLY CULTIVATION 2. Draught 3. Pest/rodents destroyed the farm 4. Bush fires destroyed crops on the field before harvest 5. Other
H3	Which period did your last season harvest run out?	1. Between Oct – Dec 2. Between Jan – Mar 3. Between Apr – June 4. Between Jul – Aug
H4	Did your household buy food last year?	1. Yes go to H7 → 2. No
H5	When did you or your household buy food?	1. Between Oct – Dec 2. Between Jan – Mar 3. Between Apr – June 4. Between Jul – Aug
H6	Who in the household is responsible for buying the household's food?	1. Female spouse 2. Male spouse 3. Female child 4. Male child 5. Female relative 6. Male relative 7. Other male 8. Other female
H7	How long will your current harvests last?	1. ..... Months 99. Do not know
H8	Do you expect to experience food shortage in your household this year?	1. Yes 2. No go to H10 →
H9	Why do you expect a food shortage?	1. FLOOD/HEAVY RAINS PREVENTED EARLY CULTIVATION 2. Draught 3. Pest/rodents destroyed the farm 4. Bush fires destroyed crops on the field before harvest 5. Other (specify)
H10	Does your household engage in dry season farming?	1. Yes 2. No go to H13 →
H11	Which of the following do you grow in your dry season farm?	1. Cereals and grains 2. Roots and tubers 3. Legumes 4. Vegetables 5. Fruits
H12	Do you want to continue farming or go into another field of work or profession? (State type of job/work/profession)	

H13	Tell us your aspirations within the next 5 years	
H14	Does any member of the household have other sources of income other than farm income?	1. Yes 2. NO GO TO H16
H15	If yes, what are these sources? (Multiple choice possible)	a) Salaried worker b) Petty trading c) Food processing d) Tailoring/sewing e) Contracting/farm labour f) Artisan e.g. Carpentry/joinery g) Other (specify)
H16	How long have you or this household member been in this income generating activity?	
H17	What is the average annual income earned from this activity?	¢.....per year
H18	Do you or any member of your household cultivate cash crops?	1. Yes 2. No go to H 20 →
H19	WHAT TYPE OF CASH CROP DO YOU CULTIVATE?	1. Cocoa 2. Citrus Fruits 3. Cashew 4. Rice 5. Other (specify)
H20	Does any member of the household have access to credit?	1. Yes 2. No go to SECTION I →
H21	Who in the household has access to credit?	1. Female spouse 2. Male spouse 3. Female child 4. Male child 5. Female relative 6. Male relative 7. Other male 8. Other female
H22	What kind of credit did (s)he obtain?	1. Cash 2. Input credit 3. Other (specify)
H23	From where did (s)he obtain the credit?	1. Individuals 2. Money lenders 3. Group saving and credit 4. Informal credit association (like susu group) 5. NGO or project 6. Arrangements (including DA poverty alleviation fund) 7. Rural bank 8. Other (specify)

I - HOUSEHOLD AMENITIES

I1	What is the material of the roof of the house?	1. Palm fronds/raffia/plantain leaves 2. Thatch 3. Wood/wood bark 4. Tin sheets 5. Bamboo 6. Roofing tiles 7. Asbestos 8. Other

I2	What is the material of the walls of the house?	1. Mud/Mud bricks 2. Stone 3. Burnt bricks 4. Cement/sandcrete 5. Wood/bamboo 6. Tin sheets 7. Other
I3	WHAT IS THE MAIN SOURCE OF DRINKING WATER?	1. Piped into dwelling or compound 2. Public outdoor tap or borehole 3. Protected well 4. Unprotected well, rain water 5. River, lake, pond 6. Vendor, truck 7. Other
I 4	How many metres is the water source from your cottage?	..... meters
I 5	Do you and other community members fetch water from this source all year round?	1. Yes GO TO I 8 2. No
I 6	If No which period is it not possible to fetch water from the source?	1. Jan – March 2. April - June 3. July – September 4. October- December
I 7	Why is it not possible to get water from the source?	1. Broken down equipment 2. Not yielding water (Dry) 3. Pollution 4. Do Not know
I 8	What maintenance work do you and the community usually carry out on the water sources?	1. Desilting 2. Pump repairs 3. None 4. Do not know
I 9	Do you presently do anything to the water to make it safe to drink?	1. Yes 2. No
I 10	If Yes what do you do?	1. Filter 2. Add alum 3. Boil 4. Other (specify)
I 11	What kind of toilet facility does your household use?	1. None (Free range) 2. Flush to sewer 3. Flush to septic tank 4. Pan/bucket 5. Covered pit latrine 6. Uncovered pit latrine 7. Ventilation improved pit latrine 8. Other
I12	What is the main fuel used for cooking?	1. Firewood 2. Charcoal 3. Kerosene/oil 4. Gas 5. Electricity 6. Crop residue/sawdust 7. Animal waste 8. Other
I13	What is the main fuel used for lighting?	1. Kerosene/paraffin 2. Gas 3. Mains electricity 4. Generator

		5. Battery 6. Candles 7. Firewood 8. Other
I14	How long does it take from here to reach the nearest...?	1. Supply of drinking water..... 2. Food market ..... 3. Public transportation ..... 4. Primary school ..... 5. Secondary school ..... 6. F. Health clinic or hospital. .....

J - PUBLIC HEALTH AND SAFETY		
J1	Where do members of your household seek medical attention?	1. Self Medicate 2. Herbalist 3. Fetish Priest 4. Spiritualist 5. Clinic/Hospital 6. Other (Specify)
J2	What is the distance from your place of residence to the point where medical attention is sought? (Miles)	
J3	Did any member of your household have a live birth in the last 12 months?	1. Yes 2. No IF NO GO TO J6.
J4	Did the member receive pre-natal care during the pregnancy?	1. Yes 2. No
J5	Who in the household received pre-natal care during pregnancy?	1. Female spouse 2. Female child under 17 3. Female relative under 17 4. Female relative over 18 5. Other female under 17 33. Other female over 18
J6	Is any member of your household physically or mentally handicapped or disabled?	1. Yes 2. No Include person only if handicap prevents him or her from maintaining a significant activity or schooling.
J7	Was any member of your household sick or injured in the last 4 weeks?	1. Yes 2. No

J8	What sort of sickness/injury did household members suffer? YOU MAY MARK MORE THAN ONE ANSWER.	1. Fever/Malaria 2. Diarrhea 3. Accident 4. Dental 5. Skin condition 6. Eye 7. Ear, nose or throat 8. Other
J9	How many days of work/school did the member miss due to illness/injury?	1. None 2. 1 week or less 3. 1 to 2 weeks 4. More than 2 weeks
J10	Did the sick or injured household member consult a health provider or traditional healer for any reason in the last 4 weeks?	1. Yes 2. No

J11	What kind of health provider did the sick or injured member see?	1. Private dispensary/hospital 2. Public dispensary/hospital 3. Community health center 4. Private doctor/dentist 5. Traditional healer 6. Regional hospital 7. Missionary hospital/dispensary. 8. Pharmacy/chemist 9. Other
J12	How many times did the sick or injured member use the service in the last 4 weeks?	1. 1 to 3 2. 4 to 6 3. More than 6
J13	Did sick or injured member have any complaints at the time of the visit? YOU MAY MARK MORE THAN ONE ANSWER.	1. No problem (satisfied) 2. Facilities were not clean 3. Long waiting time 4. No trained professionals 5. Too expensive 6. No drugs available 7. Treatment unsuccessful 8. Other
J14	Why did sick or injured member not use medical care in the last 4 weeks? YOU MAY MARK MORE THAN ONE ANSWER.	1. No need 2. Too expensive 3. Too far 4. Other
J15	Which ailments have persons in your household suffered from the past year	1. Malaria 2. Cough 3. Diarrhea 4. Skin infection 5. Sexually transmitted disease 6. Eye disease 7. Tooth ache 8. Cholera 9. Fever 10. Birth complication (Women) 11. Impotency (Men) 12. Other (specify)

KNOWLEDGE ABOUT HIV / AIDS AND STDS

J 16	Do you know of any household member who has HIV / AIDS? 1. YES 2. NO	If Yes, Mention who……
J 17	Mention any 3 sources of transmission of HIV that you know	1…… 2…… 3……
J 18	Mention any three (3) symptoms of HIV / AIDS	1…… 2…… 3……
J 19	Do you know of any household member who has been tested HIV positive?	1. YES 2. NO
J 20	Do you know of any household member who has died of HIV/AIDS? 1. YES 2. NO	If yes, Mention who……
J 21	If Yes, when and which hospital/clinic/herbalist did he/she attend last?	
J 22	Do you know of any Sexually Transmitted Disease (STD)? 1. YES 2. NO	If yes, mention some 1…… 2…… 3……
J 23	Have you received any form of education on HIV/AIDS & STDs?	1. YES 2. NO

J 24	What was the source of your education?	
J 25	Did you find it as beneficial?	
J 26	Do you still find it necessary to get any further education and training on HIV / AIDS?	1. YES 2. NO
J 27	Are you prepared to volunteer as HIV/AIDS Care Provider/Counsellor **OR** on some sort of allowance/salary?	
J 28	Do you know of any orphan/s of HIV/AIDS?	If yes, mention who……

K - PARTICIPATION IN COMMUNITY LIFE		
K1	Which of the following community group do you belong?	1. Farmers Association 2. Religious group 3. Youth Development Association 4. Cultural Troupe 5. Other (specify)
K2	Are you a leader in any of these groups?	1. Yes 2. No
K3	Are you a member of any of the following?	1. District Assembly 2. Area Council 3. Unit Committee 4. Community Development Committee 5. Other (specify)
K4	Is any other member of the household a leader in a community group?	1. Yes 2. No
K5	How will you describe your participation in community life?	1. Very active 2. Active 3. Not active
K6	Is there any household nearby where you have friends who can help you?	1. Yes 2. No.
K7	What type of help do you receive from this household?	1. Financial (cash, loans) 2. Material gifts (food, water, fuel, inputs etc.) 3. Farm labour 4. Counsel and advice 5. Child care/ child minding 6. Other (specify)
K8	What is your evaluation of communal sprit in this community	1. Very Encouraging 2. Encouraging 3. Not encouraging

L - BACKGROUND INFORMATION (SOCIO CULTURAL)		
L1.	Gender	1. Male 2. Female
L2.	Age (years)	
L3.	Highest Educational level attained	1. None 2. Primary 3. Middle/JSS 4. Secondary 5. Tertiary
L4.	MARITAL STATUS	1. Never married 2. Married (monogamous) 3. Married (polygamous) No. of wives …….. 4. Divorced/separated 5. Widowed 6. Other (Specify)————
L5.	Religion	1. Christian 2. Islam 3. Traditional 4. Atheist 5. Bahai 6. Buddhist 7. Others (specify) ————
L6.	Are you a native of New Abirem?	1. Yes 2. No
L7.	Are you a native of Adausena?	1. Yes 2. No
L8.	If NO, where is your Hometown?	

L9	If No, where is your hometown?				
L 10	What is the distance from your hometown to New Abirem / Adausena?				
L11	Why did you move to this area?	1. To Farm 2. To Trade 3. To attend school 4. To join family			
L12.	Do you have any relative with working experience in any of the following areas?	1. Driving 2. Operation of equipment of any kind 3. Mechanical skills 4. Electrical skills 5. Electronic skills 6. Plumbing 7. Masonry 8. Carpentry 9. Warehousing/store keeping skills 10. Administrative/clerical skills 11. Any industrial experience 12. Other (specify)			
L13.	WHERE DOES THIS RELATIVE STAY?	1. …… (Birim North District) 2. …… (Not in Birim North but within E / R) 3. …… (NOT IN E / R)	1. …… (Birim North District) 2. …… (Not in Birim North but within E / R) 3. …… (NOT IN E / R)	1. …… (Birim North District) 2. …… (Not in Birim North but within E / R) 3. …… (Not in E / R)	1…… (Birim North District) 2…… (Not in Birim North but within E / R) 3. …… (Not in E / R)

L14.	How long have you been resident in New Abirem / Adausena?	
HOUSEHOLD COMPOSITION		
L15.	Household size	
L16.	Number of Females	
L17.	Number of Males	
L18.	No. of female children aged 0-17	
L19.	No. of male children aged 0-17	
L20.	No. of female adults aged 18-60	
L 21	No. of male adults aged 18-60	
L 22	No. of females in paid employment	
L 23	No of males in paid employment	
L 24	No. of females in school	
L 25	No. of males in school	

M - LIST OF ALL HOUSEHOLD MEMBERS

	No.	M1 Name	M2 Sex	M3 Age		M4 Relation - ship to Respondent	M5 Contribute to household income? (state form i.e. Cash or in-kind)	M6 Residence	M7 What is (s)/he doing?
				M31 Birth date Dd/mm /yy	M32 Age group				
	1		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1.Spouse 2.Child 3.Parent 4.Other relative 5.Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at…… Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
	2		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs	1. Spouse 2. Child 3. Parent 4. Other relative	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at……. Outside	1. Schooling 2. Working 3. Farming 4. Trading 5.

				6. 60-64yrs 7. 65+yrs	5. Not related		household	Apprentice 6. Other
	3		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
	4		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1.Yes 2.No a.Cash b.In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
	5		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No Cash In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
	6		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	Yes No Cash In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
	7		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
	8		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1.Schooling 2.Working 3.Farming 4.Trading 5.Apprentice 6.Other
	9		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1.Schooling 2.Working 3.Farming 4.Trading 5.Apprentice 6.Other
	10		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1.Schooling 2.Working 3.Farming 4.Trading 5.Apprentice 6.Other
	11		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1. Spouse 2. Child 3. Parent 4. Other relative 5. Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1.Schooling 2.Working 3.Farming 4.Trading 5.Apprentice 6.Other
	12		1. M		1. 0-4 yrs	1. Spouse	1. Yes	1. Stay in	1. Schooling

		2. F		2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	2.Child 3.Parent 4. Other relative 5.Not related	2. No a. Cash b. In-kind	household 2. Staying at ……. Outside household	2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
13.		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1.Spouse 2.Child 3.Parent 4.Other relative 5.Not related	1. Yes 2. No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
14.		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1.Spouse 2.Child 3.Parent 4.Other relative 5.Not related	1.Yes 2.No a. Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other
15.		1. M 2. F		1. 0-4 yrs 2. 5-12yrs 3. 13-15yrs 4. 16-18yrs 5. 19-49yrs 6. 60-64yrs 7. 65+yrs	1.Spouse 2.Child 3.Parent 4.Other relative 5.Not related	1.Yes 2.No Cash b. In-kind	1. Stay in household 2. Staying at ……. Outside household	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other

N - CHILDREN UNDER 5

No.	N1 Name	N2 Sex	N3 Name of Mother (Enter 99 if dead or not a member of household)	N4 Birth date *dd/mm/yy*	N5 Where was the child delivered?	N6 Who delivered the child?	N7 Did the child participate in the following?	N8 How many months did you exclusively breastfeed (named child)?
1		1. M 2. F			1. Hospital / maternity 2. At home 3. Other	1. Doctor 2. Nurse 3. Midwife 4. T.B.A. 5. Other /self	1. Growth monitoring 2. Immun - isations	1. —— months 2. Do Not Know
2		1. M 2. F			1. Hospital / maternity 2. At home 3. Other	1. Doctor 2. Nurse 3. Midwife 4. T.B.A. 5. Other / self	1. Growth monitoring 2. Immun - isations	1, —— months 2. Do Not Know
3		1. M 2. F			1. Hospital /maternity 2. At home 3. Other	1. Doctor 2. Nurse 3. Midwife 4. T.B.A. 5. Other /self	1. Growth monitoring 2. Immun- isations	1. —— months 2. Do Not Know
4		1. M 2. F			1. Hospital /maternity 2. At home 3. Other	Doctor Nurse Midwife T.B.A. Other/self	1. Growth monitoring 2. Immun - isations	1. —— months 2. Do Not Know
5		1. M 2. F			1. Hospital /maternity 2. At home	1. Doctor 2. Nurse 3. Midwife	1. Growth monitoring 2. Immun -	1. —— months

					3. Other	4. T.B.A. 5. Other /self	isations	2. Do Not Know

O – CHILDREN BELOW 18 YEARS WHO DO NOT STAY IN THE HOUSEHOLD							
No.	01 Name	02 Sex	03 Age in yrs	04 Where does (s)he stay	07 With whom	06 What is (s)he doing	07 Type of work/ apprenticeship
1		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
2		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
3		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R	1. Boarding School 2. Father 3. Aunt/Uncle 3. Grandparents 4. Other relative 5. Other 6. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
4		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
5		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1, Schooling 2. Working 3. Farming 4. Trading 5 .Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
6		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
7		1. M		1. ……	1. Boarding	1. Schooling	1. Clerical

		2. F		(As Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	School 2. Father 3 .Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
8		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3 .Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
9		1. M 2. F		1. …… (Birim North District) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Apprentice 4. Other 5. Do not know	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
10		1. M 2. F		1. …… (Birim North) 2. …… (Not in Asutifi District but within E / R) 3. …… (Not in E/R)	1. Boarding School 2. Father 3. Aunt/Uncle 4. Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others
11		1. M 2. F		1. …… (Birim North) 2. …… (Not in Birim North District but within E / R) 3. …… (Not in E / R)	1. Boarding School 2. Father 3. Aunt/Uncle 4 .Grandparents 5. Other relative 6. Other 7. Do not know	1. Schooling 2. Working 3. Farming 4. Trading 5. Apprentice 6. Other	1. Clerical 2. Professional 3. Carpentry 4. Masonry 5. Electrical 6. Electronic 7. Mechanical 8. Others

ANNEX K

NEWMONT GHANA GOLD LIMITED

AHAFO GOLD PROJECT

IDENTIFICATION OF COMPENSATION LAND

REPORT V4.0a - FINAL - B314
Project N°: B314

PREPARED BY SGS ENVIRONMENT

This Final Report is issued by :

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Submitted by :

SGS ENVIRONMENT

July 2004

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INTRODUCTION

Background Information

Newmont Ghana Gold Limited (NGGL) commissioned SGS Environment (SGS) to provide consultancy services for the identification of potential compensation land required as part of the proposed development of the Ahafo Gold Mine in the Brong Ahafo Region of Ghana.

The Ahafo Project Area is heavily populated. It contains an important number of settler farmers' homesteads, and plantation croplands including cocoa and oil palm plantations. Within the planned mine footprint, about 70% of the land falls on cropped lands and residences. To maintain the livelihood of those affected farm settlers it is necessary to provide them with alternative lands of equal quality and productivity.

With the exception of the surrounding forest reserves, virtually all lands suitable for farming in the vicinity of the proposed Ahafo Mine have owners and are being farmed presently or fallowed for future farming. In recognition of this land shortage, NGGL proposes to compensate affected owners of land with cash, calibrated to reflect displaced productivity. In recognition that the mine must provide alternative sites for settlement of displaced homesteads, and anticipating that some affected owners may desire to continue farming in the area, NGGL wants to learn the location, size, and relevant characteristics of presently unused land, which might be used for land compensation.

Purpose of the Consultancy

The purpose of the consultancy is to provide NGGL with the results of a systematic search for presently unused lands of suitable quality for use in land compensation for farms areas required for project development.

More specifically, the assignment involved the following tasks, which are presented in this report:

1. Review of existing information on climate, land resources, settlement and agricultural information for the vicinity of the mining sites.

2. Photo-interpretation of satellite imagery to delineate both cropped and uncropped lands and ground truthing of the delineated units to establish their land use contents. Two sets of digitised maps were produced out of these activities. The first set of maps covers present land use of the Search Area which include the mine footprint site at a scale of 1:10,000 while the second set, produced at a scale of 1:20,000 indicates suitability of uncropped lands, that can be used for land compensation within an approximately 4 km radius from the proposed mine footprint.

Locations and Extent

The Search Area, lies wholly within the Asutifi District of the Brong Ahafo Region and on the stool lands of Kenyase No.1, Kenyase No.2 and Ntotoroso Paramouncy.

The total area to be occupied by the Ahafo Mine Footprint is approximately 2,769 ha out of which an area of 1,558 ha was surveyed under the present exercise (Figure 1.1).

REVIEW OF PREVIOUS STUDIES

Population

The area is heavily populated. According to the national 2000 population and housing census (GSS, 2002) the Asutifi District recorded a total of 84,485 inhabitants out of which 43,052 were males and 41,433 were females. Table 2.1 below presents the number of inhabitants of the main settlements within and around the Search Area.

Table 0.1: Number of inhabitants in the main settlements within and around the Search Area

Major settlements within the NGGL Search Area		**Large settlements lying just outside the Search Area**	
Kenyase No.1	3599	Hwidiem	5472
Kenyasi No.2	7451	Achirensua	4420
Ntotoroso	2643	Goaso	13371
Wamahiniso	1474	Yamfo	8312
Gyedu	1186	-	-

Inhabitants belong to the country's major ethnic groups, such as Akans, Ewes, Dagombas, Frafra, Dagartis, Fantis, Guans and Brongs.

Agricultural production is the main economic activity in the Search Area and is practiced mainly on subsistence level with a few farmers engaged in plantation agriculture.

Climate

The Search Area falls within the wet semi-equatorial climatic zone of Ghana. It is conditioned by the passage of the inter-tropical zone of convergence, which passes over the area twice in a year giving rise to two well defined rainfall seasons. The major wet season usually starts from mid-March to the end of July with a peak fall in June during which more than half of the annual rainfall amount may fall. The minor wet season begins in September and ends in mid-November. August experiences the minor dry season while the major dry season extends from mid-November to mid-March. During this period the dry desiccating harmattan winds blow across the area from the north. January is the driest month of the year. The mean annual rainfall is in the neighborhood of 1400 mm.

Temperatures are high and about constant throughout the year with mean monthly figures ranging from 23.9°C to 28.4°C. March, at the beginning of the major wet season, is the hottest month of the year with a mean temperature of approximately 27.8°C while August is the coolest month with a mean temperature of 24.6°C. The mean absolute maximum and minimum temperatures are usually recorded in February and in August respectively. Variations between day and night temperatures are greatest during the dry seasons than during the wet seasons.

Relative humidity in the mornings is usually at its highest during the wet seasons from June to October when mean monthly figures may range between 88-90% during 0900 hours decreasing to 65 – 78% at 1500 hours. The lowest relative humidity usually occurs from February to April when it may ranges between 80% and 87% in the mornings and between 45% and 65% in the afternoons.

Winds speeds are generally low with an average speed of 8 km per hour. Wind speeds are least at night and during the early mornings. Surface wind speeds are greatest during the middle of the afternoons when average values rise to 8 – 16 km per hour. The highest wind speeds occur as gusts, associated with line squalls accompanying local thunderstorms (Walker, 1962).

Table 0.2: Mean Monthly and Annual Rainfall (mm)

Station	Main Dry Season			Main Wet Season					Short Dry Season	Minor Wet Season			Annual Total	No. of Years
	Dec.	Jan.	Feb.	March	April	May	June	July	Aug	Sept.	Oct.	Nov.		
Bechem	18.1	8.3	40.3	131.8	135.9	174.0	196.2	128.5	82.8	171.1	180.8	42.7	1310.5	25
Sunyani	17.70	5.80	40.20	27.70	114.50	145.60	176.10	103.80	77.60	160.50	171.20	31.30	1172.0	30
Goaso	26.67	13.97	49.28	125.48	164.85	186.44	236.22	114.05	83.06	195.83	256.54	97.54	1555.0	19

Table 0.3: Mean Monthly Temperature (°C)

Station	Main Dry Season			Main Wet Season					Short Dry Season	Minor Wet Season			No. of Years
	Dec.	Jan.	Feb.	March	April	May	June	July	Aug	Sept.	Oct.	Nov.	
Bechem	24.5	24.7	27.0	27.2	27.0	26.6	25.4	24.5	24.3	25.0	25.6	25.9	25
Sunyani	24.9	25.6	27.9	28.0	27.5	26.8	25.7	24.6	24.4	25.0	25.6	26.2	30

Table 0.4: Mean Monthly Relative humidity (%)

Station	Hours	Main Dry Season			Main Wet Season					Short Dry Season	Minor Wet Season			No. of Years
		Dec.	Jan.	Feb.	March	April	May	June	July	Aug	Sept.	Oct.	Nov.	
Sunyani	0600	94.2	84.1	87.1	91.0	94.0	95.6	96.3	95.8	95.7	96.6	96.7	96.3	30
	1500	90.3	52.4	53.0	53.6	53.8	55.9	8.2	60.7	63.6	67.2	72.1	79.2	

Source: Meteorological Services Department, Accra

Vegetation and Land-use

The natural vegetation of the Search Area falls within the moist semi-deciduous forest zone of Ghana characterized by the plant species of the Celtis-Triplochiton Association (Taylor, 1952). With the exception of the Bosomkese Forest Reserve, the vegetation has degraded as a results of low input agriculture and become a mosaic of plantation crops (cocoa, oil palm, citrus and teak plantations), mixed food crops (vegetable and legumes farms) and fallow farmlands consisting of secondary forests, fallow thickets, forb regrowth and waterlogging prone-land dominated by pure stand of elephant grass (See APPENDIX I for a description of these areas).

Relief and Drainage

The topography of Search Area is generally undulating to rolling with most parts lying between 200 to 250 m above sea level. Mountains and inselbergs are absent within the Search Area but low-lying, almost flat topped, elongated ridges occur as interfluves.

The area has been heavily dissected by numerous water bodies with broad sandy valleys. During the major dry season, streams dry up completely or reduce in volume drastically into discontinuous pools

along their courses. All streams flow south-easterly into the Tano River. The main streams within the Search Area include the Subri, Amama, Adensu, Ntotoro, Asuokoo, Samansua, Subrika and Akantansu.

Soil resources

The soils of the Search Area and its environ have been developed over two main parent rocks. These are the Lower Birimian rocks and colluvio-alluvial deposits along valleys of rivers and streams and the alluvial flats of Tano River. The Lower Birimian rocks consist of mainly phyllites schists and gneiss. They were laid down in early geological times (Pre-cambrian age) and consist mainly of clay deposits which subsequently hardened and altered by heat and pressure (Junner, 1940 and Moon, 1962).

The upland soils are developed in-situ and are moderately deep to deep, well drained brownish to reddish in colour, with appreciable amounts of ironstone and quartz gravels and stones. Plinthite and its hardened form, ironstone (petroplinthite) are common in the subsoils and ironstone and quartz outcrops on the surface. The middle to lower slope sites are occupied by very deep, well to moderately well drained, yellowish to brownish coloured medium to light textured soils free of gravels and stones. Plinthite forms deep down the profile. The wide valleys of streams and rivers consist of hydromorphic soils developed over colluvio-alluvial deposits. These soils are very deep, poorly drained, gray with numerous prominent mottles and of varying textures with few subrounded quartz stones (Adu, 1992).

The wide alluvial flats along the Tano River are occupied by pure stand of elephant grass (*Saccharum spontaneous*) consist of soils developed over the alluvial deposits mostly of hornblende gneiss origin. The soils are generally very deep, dark in colour, strongly mottled moderately to poorly drained, acid in reaction and consist of mainly montomorrilonitic clay mineralogy. They are plastic in nature, swell in wet conditions and shrink in dry state. They are therefore unstable and move creating slickenside conditions with prominent gilgai microrelief and wedge-shaped aggregates. They resemble the black clay soils of the Lower Volta Basin of Coastal Savanna Zone Brammer (1962), Asiamah, (1985, 2001).

The soils of the Search Area in general, are poor in plant nutrients and acidic in reaction due to intensive leaching of bases by the high rainfall regime prevailing in the area and prolonged peasant low-input agriculture that has resulted in intensive nutrient mining.

The Genesis and a general description of the soils of the area is presented in APPENDIX II.

Photo-interpretation of satellite imagery and MAP PRODUCTION

Introduction

The satellite image acquired by Newmont Ghana Gold Limited and used for the land use interpretation assignment of the Search Area was processed at the Centre for Remote Sensing and Geographic Information Services (CERSGIS). The source image was an enhanced true color satellite imagery from the QuickBird satellite with a resolution of 60 cm. The image was acquired on 28 December 2003, and warped using UTM/WGS'84 to Ghana National Grid/Legon datum.

Map composition covered an area of approximately 16,850 ha for which image data was available. This means only some two-thirds of the total original Search Area of 25,536 ha could be analyzed. A 1 km x 1 km grid was used as standard frame for sub-setting the image data for the map composition. An extended frame was used along the edges of the acquisition area where the image data extended slightly beyond the 1 km x 1 km standard grid. The maps were produced at a scale of 1:2,500.

A total of 186 image map sheets out of a total of 287 map sheets were produced.

Photo-Interpretation

Manual interpretation

Manual photo-interpretation of land use and land cover for each of the 186 map sheets were carried out using the following features:

- Tone: Consideration was given to the brightness or relative shade of an area on the image;
- Shape: The characteristic forms of individual objects for example palm fronds, river or channel courses, houses on the image;
- Pattern: The characteristic repetition or variation of tones and shapes, for which the individual shapes were visible, example tree plantations on the image;
- Texture: This was based on the characteristics smoothness or roughness of the image by repetition or variation of tones and shape;
- Natural and artificial boundaries;
- Nearness to identifiable features;
- Local reference level experience.

Using the above features, the following land use/land cover classification were arrived at:

1. ***Cultivated land***

    a. Mixed arable crops
    b. Sole crops
    c. Mixed forest and plantation crops e.g. cocoa
    d. Forbs regrowth

2. ***Uncultivated land***

    a. Forest
    b. Grassland
    c. Mixed forest/grassland
    d. Riparian thicket
    e. Disturbed/excavated areas (including bare land)

3. ***Settlement***

    a. hamlets
    b. villages
    c. towns

4. ***Roads***

    a. Major
    b. Feeder

5. ***Rivers***

a. Rivers (Major)
b. Streams

Ground Truthing of Satellite imagery

A photo-interpretation exercise was carried out on 186 sub scenes of satellite imagery at a scale of 1:2,500 and of 1 square kilometre coverage.

The land use units of the area as indicated on the imagery were carefully delineated based on the following features:

1. tone (colour);
2. texture;
3. shape;
4. spacing;
5. nearness to natural and artificial objects;
6. regularly spacing features;
7. natural and artificial boundaries and local reference level.

The following legends were built for the units delineated:

Cultivated Lands

Cco	-	Cocoa plantation
Cop	-	Oil Palm plantation
Ctk	-	teak plantation
Cmc	-	Mixed food crop farms
Cpl	-	Plantain farms
Cvg	-	Vegetable farms
Csg	-	Sugarcane farms
Cct	-	Citrus plantation
Cfr	-	Forbs regrowth
Cnf	-	Newly cultivated lands
Cvn	-	Vertiver grass nursery

Uncultivated Lands

Ufr	-	forest reserve
Usf	-	secondary forest
Utk	-	Fallow thicket
Ust	-	River/Stream course thicket
Ueg	-	Elephant grass stand
Del	-	Disturbed/Excavated lands

Settlements

Sft	-	Farmsteads/cottage
Svi	-	Villages
Sto	-	Towns
Sco	-	Schools
Shc	-	Health centres

Sps - Police station
Sch - Court houses
Scc - Community centres

The delineated units were ground truthed establishing the crop and non-crop plant species contents of the units.

Pure stands of elephant grass (Ueg) cover over twenty five percent of the Search Area treated and consists of pure stand of elephant grass (*Saccharum spontaneous*) with tall emergent trees of oil palm, cola gigantea, *Ceiba pentandra*, *Bombax buouozopenze* and *Triplochiton sceroxylon*. Small parcels of vegetables, oil palm, teak plantation and mixed crop farms exist within this unit.

Cocoa (Cco), Oil Palm (Cop) and plantain (Cpl) plantations account for 6.9 percent of the uplands while secondary forest (Usf), fallow thickets (Utk), forb regrowth (Cfr) and mixed crop farms (Cmc) riverain thicket (Ust) and newly cultivated land (Cnf) cover the rest of the Search Area.

Forb regrowth (Cfr) consists of relics of food crops vegetables and legumes.

Mixed food crop farm unit (Cmc) consists mostly of plantain, cocoyam, pawpaw, cassava, legumes and vegetables, while the pure vegetable farm unit (Cvg) has pepper, garden eggs, okro and legumes.

Surrounding the settlement sites are fallow thicket (Utk), secondary forest (Usf), forb regrowth (Cfr) and mixed crop farms (Cmc) that are near enough and can be developed into gardens and compound farms.

The units delineated and other features exhibited on the imagery have been digitized to produce the following maps:

- Land use maps at a scale of 1:10,000 covering the Search Area and the Mine Footprint Area;
- Land use map at a scale of 1:2,500 covering the Mine Footprint Area and
- Land use maps at a scale of 1:20,000 covering the Search Area less the Mine Footprint Area.

These maps are provided separately from this report.

Results of Photo-interpretation

Present Land Use Coverage of the Search Area

The portions of the Search Area covered by the available 186 satellite imagery sheets, measuring approximately 16,850 ha, were demarcated into land use units. Each sheet, representing 1 km x 1 km at a scale of 1:2500 was analysed and photo-interpreted into existing land use units and characteristics.

The legend of the photo-interpretation was based on units of cultivated lands (cocoa, oil palm, teak, plantain plantation, mixed food crops farms, vegetable farms, forb regrowth, newly cultivated farms and sugar cane farms) and uncultivated lands (forest reserves, secondary forest, fallow thickets, riparian thickets and elephant grass stand). Miscellaneous units consist of settlements (villages, towns, schools and farmsteads), disturbed/excavated lands and roads.

The units were ground truthed to ascertain the various crop and tree contents.

Present land use map at a scale of 1:10,000 were then produced and on screen digitised. The entire Search Area was mapped and divided in five working blocks (A-E). The surface areas of these blocks are as follows:

Block A: 3781.7 ha (See Figure 4.1)
Block B: 3592.5 ha (See Figure 4.2)
Block C: 2921.1 ha (See Figure 4.3) **TOTAL: 16,846.6 ha**
Block D: 3700.7 ha (See Figure 4.4)
Block E: 2850.6 ha (See Figure 4.5)

Details of present land use coverage of the entire Search Area and for each of the five blocks are presented in Tables 4.1 and 4.2 respectively. Table 4.3 show percentage areas for each block.

Table 0.5: Present land use coverage (ha) of the entire Search Area

Units	Area (ha)	Percent of total area
Citrus Plantation	***7.6***	0.05
Cocoa Plantation	***766.5***	4.55
Oil Palm Plantation	***202.3***	1.20
Plantain farm	***154.2***	0.92
Vegetable Farm	***4.5***	0.03
Mixed Food crops Farm	***1324.8***	7.86
Sugarcane farm	***0.4***	0.00
Newly Cultivated land	***388.8***	2.31
Teak Plantation	***4.3***	0.03
Forbs Regrowth	***2535.6***	15.05
Fallow Thicket	***3594.0***	21.33
Forest Reserve	***206.0***	1.22
Secondary Forest	***2532.3***	15.03
Riparian Thicket	***204.2***	1.21
Elephant grass stand	***4683.7***	27.80
Disturbed/Excavated Land	***10.4***	0.06
Towns	***156.3***	0.93
Villages	***10.2***	0.06
Schools	***1.2***	0.01
Farmsteads/cottages	***19.2***	0.11
Roads	***36.0***	0.21
Vetiver Grass Nursery	***4.1***	0.02
Total	**16846.6**	**100.0**

Table 0.6: Present land use coverage (ha) of Working Blocks A, B, C, D, E

Units	Block A	Block B	Block C	Block D	Block E
Citrus Plantation	0.1	2.6	3.0	1.0	0.9
Cocoa Plantation	25.6	630.9	49.5	60.5	0.0
Oil Palm Plantation	29.7	48.9	56.5	42.0	25.2
Plantain farm	15.1	111.3	17.0	8.4	2.4
Vegetable Farm	0.0	0.3	1.3	2.9	0.0
Mixed Food crops Farm	3.5	900.3	322.9	90.7	7.4
Sugarcane farm	0.0	0.0	0.4	0.0	0.0
Newly Cultivated land	156.2	54.3	61.2	71.2	45.9
Teak Plantation	0.0	3.7	0.6	0.0	0.0

Forbs Regrowth	1011.7	148.8	72.4	859.2	443.5
Fallow Thicket	1433.3	397.2	437.3	719.2	607.0
Forest Reserve	0.0	0.0	0.0	206.0	0.0
Secondary Forest	1054.6	322.6	0.0	760.9	394.2
Riparian Thicket	0.0	2.9	20.3	106.1	74.9
Elephant grass stand	2.0	951.3	1781.7	703.7	1245.0
Disturbed/Excavated Land	4.3	3.0	0.0	3.1	0.0
Towns	25.3	0.0	81.9	49.1	0.0
Villages	3.9	5.2	1.1	0.0	0.0
Schools	0.0	0.0	1.0	0.2	0.0
Farmsteads/cottages	6.2	5.1	3.2	2.8	1.9
Roads	10.2	0.0	9.8	13.7	2.3
Vetiver Grass Nursery	0.0	4.1	0.0	0.0	0.0
Total	**3781.7**	**3592.5**	**2921.1**	**3700.7**	**2850.6**

Table 0.7: Present land use coverage (%) of Working Blocks A, B, C, D, E

Units	**Block A**	**Block B**	**Block C**	**Block D**	**Block E**
Citrus Plantation	0.00	0.07	0.10	0.03	0.03
Cocoa Plantation	0.68	17.56	1.69	1.63	0.00
Oil Palm Plantation	0.79	1.36	1.93	1.13	0.88
Plantain farm	0.40	3.10	0.58	0.23	0.08
Vegetable Farm	0.00	0.01	0.04	0.08	0.00
Mixed Food crops Farm	0.09	25.06	11.05	2.45	0.26
Sugarcane farm	0.00	0.00	0.01	0.00	0.00
Newly Cultivated land	4.13	1.51	2.10	1.92	1.61
Teak Plantation	0.00	0.10	0.02	0.00	0.00
Forbs Regrowth	26.75	4.14	2.48	23.22	15.56
Fallow Thicket	37.90	11.06	14.97	19.43	21.29
Forest Reserve	0.00	0.00	0.00	5.57	0.00
Secondary Forest	27.89	8.98	0.00	20.56	13.83
Riparian Thicket	0.00	0.08	0.69	2.87	2.63
Elephant grass stand	0.05	26.48	60.99	19.02	43.68
Disturbed/Excavated Land	0.11	0.08	0.00	0.08	0.00
Towns	0.67	0.00	2.80	1.33	0.00
Villages	0.10	0.14	0.04	0.00	0.00
Schools	0.00	0.00	0.03	0.01	0.00
Farmsteads/cottages	0.16	0.14	0.11	0.08	0.07
Roads	0.27	0.00	0.34	0.37	0.08
Vetiver Grass Nursery	0.00	0.11	0.00	0.00	0.00
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Present Land Use Coverage of Mine Facilities Footprint

The land use units of the mine facilities footprint areas were delineated from the satellite imagery sheet and their extent measured. These areas required for project development will need to be compensated.

The total area of the mine facilities footprint covered by the exercise is approximately 2356 ha and consists of land use units presented below in Table 4.4 (See also Figure 4.6).

A digitized land use map at a scale of 1:2,500 covering the area has been produced.

Table 0.8: Present land use coverage (ha) of the Mine Footprint Area

Units	Area (ha)	Percent of total area
Citrus Plantation	0.3	0.01
Cocoa Plantation	504.0	21.39
Oil Palm Plantation	30.6	1.30
Plantain farm	93.9	3.99
Vegetable Farm	0.4	0.02
Mixed Food crops Farm	643.7	27.32
Sugarcane farm	0.0	0.00
Newly Cultivated land	46.0	1.95
Teak Plantation	2.7	0.11
Forbs Regrowth	175.4	7.44
Fallow Thicket	352.3	14.95
Forest Reserve	0.0	0.00
Secondary Forest	199.3	8.46
Riparian Thicket	0.0	0.00
Elephant grass stand	295.6	12.55
Disturbed/Excavated Land	0.6	0.03
Towns	0.0	0.00
Villages	2.4	0.10
Schools	0.0	0.00
Farmsteads/cottages	4.7	0.20
Roads	0.0	0.00
Vetiver Grass Nursery	4.1	0.17
Total	**2356.0**	**100.0**

Present Land Use Coverage of Suitable Lands for Compensation

In order to find suitable lands to compensate farmers whose farmlands occurred within the Mine Footprint Area, land areas within a 4 km radius from the proposed Mine Footprint Area were demarcated, their land use patterns identified and their surface areas measured.

The five working blocks (A-E) were used to identify these potential areas for compensation. Two (2) digitized maps representing a potential compensation area were produced at a scale of 1:20,000 (See also Figures 4.7 and 4.8). Details of present land use coverage are presented in tables 4.5 and 4.6.

Lands of the following units within the Search Area were assessed suitable for compensation and potential acquisition by Newmont:

- Fallow thicket;
- Forbs regrowth;
- Elephant grass stand; and
- Secondary Forest;

Table 0.9: Present land use coverage (ha) South of the Mine Footprint Area		
Units	**Area (ha)**	**Percent of total area**
Citrus Plantation	6.2	0.11
Cocoa Plantation	161.8	2.75
Oil Palm Plantation	85.6	1.46
Plantain farm	38.1	0.65
Vegetable Farm	1.2	0.02
Mixed Food crops Farm	563.7	9.59
Sugarcane farm	0.4	0.01
Newly Cultivated land	114.5	1.95
Teak Plantation	0.9	0.02
Forbs Regrowth	***350.2***	***5.96***
Fallow Thicket	***843.3***	***14.35***
Forest Reserve	0.0	0.00
Secondary Forest	***259.4***	***4.41***
Riparian Thicket	71.9	1.22
Elephant grass stand	***3276.8***	***55.75***
Disturbed/Excavated Land	2.2	0.04
Towns	81.9	1.39
Villages	2.0	0.03
Schools	1.0	0.02
Farmsteads/cottages	6.2	0.11
Roads	10.8	0.18
Vetiver Grass Nursery	0.0	0.00
Total	**5878.1**	**100.0**
****Areas that can be used for compensation totaling: 4729.7 ha***		

Table 0.10: Present land use coverage (ha) North of the Mine Footprint Area		
Units	**Area (ha)**	**Percent of total area**
Citrus Plantation	1.1	0.01
Cocoa Plantation	100.7	1.17
Oil Palm Plantation	86.1	1.00
Plantain farm	22.2	0.26
Vegetable Farm	2.9	0.03
Mixed Food crops Farm	117.4	1.36
Sugarcane farm	0.0	0.00
Newly Cultivated land	228.3	2.65
Teak Plantation	0.7	0.01
Forbs Regrowth	***2010.0***	***23.34***
Fallow Thicket	***2398.4***	***27.85***
Forest Reserve	206.0	2.39
Secondary Forest	***2073.6***	***24.08***
Riparian Thicket	132.3	1.54
Elephant grass stand	***1111.3***	***12.90***
Disturbed/Excavated Land	7.6	0.09
Towns	74.4	0.86
Villages	5.8	0.07
Schools	0.2	0.00
Farmsteads/cottages	8.3	0.10
Roads	25.2	0.29
Vetiver Grass Nursery	0.0	0.00

Total	**8612.5**	**100.0**
Areas that can be used for compensation totaling: 7593.3		

A total land area of 12,323 ha can be used as compensation land.

For successful usage of these lands for farming, effective agronomic practices (soil erosion control and soil enhancement fertility) as recommended in APPENDIX III need to be adopted.

The lands under elephant grass stand can be used for commercial production of rice, sugarcane and vegetable under effective water management. The technology to use such lands for production is available at the Soil and Water Management Division of the Soil Research Institute.

CONCLUSIONS

1. A review has been carried out on land resources, settlement, agricultural information and climatic conditions of the vicinity of the mining sites.

2. One hundred and eighty six (186) out of a total of 287 map sheets were produced and photo interpreted based on land use characteristics. Each map sheet measured 1 km x 1km and at a scale of 1:2,500.

   The legend for the photo-interpretation was based on uncultivated lands consisting of forest reserves, secondary forest, fallow thickets, riparian thicket and elephant grass stand, and cultivated lands of cocoa, oil palm, teak, plantain plantation, mixed foodcrops farms, vegetable farms, forb regrowth, newly cultivated farms and sugar cane farms. Miscellaneous units consist of settlement units of villages, towns, farmsteads, schools, health centres, police stations, court houses, community centres and disturbed/excavated lands.

   The exercise has resulted in demarcation of used and unused lands that can be utilized for land compensation purposes.

3. Digitised land use maps at scales of 1:10,000 covering the entire Search Area, 1:2,500 covering the Mine Footprint Area and 1:20,000 covering areas outside the Mine Footprint Area have been produced to guide in the selection of suitable lands for settlement gardens and farms in land compensation exercise.

References

Adu, S.V (1992). Soils of the Kumasi Region, Ashanti Region, Ghana. Memoir No.8., Soil Research Institute, Kwadaso-Kumasi.

Asiamah, R.D. (1985). A detailed soil study of the 350-ha extension area to Kpong Farms, Akuse. Acres International Ltd. Niagara Falls, Ontario, Canada.

Asiamah, R.D. (2001). Characterization, description and classification of salt-affected soils in the coastal savanna zone of Ghana. Paper read at the FAO expert consultation meeting on FAO Networks on management of problem and degraded soils including salt-affected soils. 7 – 11 May 2001, Valencia Spain.

Brammer, H. (1962). Soils of Accra Plains. Memoir No.2. Soil Research Institute, Kwadaso-Kumasi.

FAO (1990). Guidelines for soil description, FAO, Rome.

FAO (1998). World reference base for soil resources (WRB). World soil resources report No. 84. FAO, Rome.

GSS (2002). 2000 Population and Housing Census, summary report on final results. Ghana Statistical Service. Republic of Ghana, Accra.

Junner, N.T. (1940). Geology of the Gold Coast and Western Togoland. Gold Coast Geo. Survey Bull. No.11. Gov't Printer, Accra.

Moon, P.A. (1962). The geology of ¼ Field sheet No. 127, Kumasi, N.W. Ghana. Geo survey Bull No.27 Gov't Printer, Accra.

NRCS (2002). Field book for describing and sampling soils. National Soil Survey Centre, Natural Resources conservation Service, USDA, Lincoln, Nebraska.

Taylor, C.J. (1952). The vegetation zones of the Gold Coast. Forestry Dept. Bull No.4. Gov't Printer, Accra.

USDA (1998). Keys to soil taxonomy, 8th edition. National resources conservation services, USDA, Washington, D.C.

Walker, H.O. (1962). Weather and climate. *In*: Agriculture and land use in Ghana. Chapter 2. Edited by J. Brain Wills, Oxford University Press, London.

APPENDIX I

1.0 DESCRIPTION OF PRESENT VEGETATION IN SEARCH AREA

Forest Reserve

Boarding the eastern portions of the Search area and along the left banks of the Tano River is the Bosomkese Forest Reserve, which serves as one of the watershed protection of the Tano River. The reserve has been degraded to some extent by timber extraction and establishment of teak plantation by the taungya practices. The commonest tree species within the reserve include *Triplochiton sceroxylon* (wawa), *Funtumia elastica* (Ofruntum), *Terminalia ivorensis* (Emire), *Terminalia superba* (Ofram), *Celtis mildbraedii* (Esa), *Ceiba pentandra* (Onyina), *Chlorophora excelsa* (Odum), *Baphia nitrida* (Odwen), *Rauwolfia*

vomitoria (Kakapenpen), *Phallanthus floribundus* (Awobe), *Astonia boonei* (Nyamedua), *Antiaris Africana* (Kyenkyen), *Alchornea cordifolia* (Ogyama) and Cola gigantia var glabbrenscens (Watapuo).

Secondary Forest

These are long abandoned cultivated lands left for 8 – 12 years and usually attain heights of about 9 meters. These areas are characterized mainly by a number of quick-growing soft-wooded trees with occasional hard woods surrounded with thick undergrowth. The common tree species include most of those listed under forest reserve sites.

Thickets

Thickets are fallowed farmland three to seven years old and characterized by impenetrable masses of shrubs, climbers, coppice shoots, young trees and relics of foodcrops. They reach heights of 6 meters. They are difficult to cut through or clear. The dominant plant species *Alchornea cordifolia* (Ogyama), *Accacia pennata* (Nwere), *Combretum mucronatum* (Ohwirem), *Baphia nitrida* (Odwen), *Rauwolfia vomitoria* (Kakapenpen), *Mallotus oppositifolius (*Satadua), *Phyllanthus floribundus* (Awobe), Astonea boonei *(Nyamedua), Ficus spp*, *Antiaris Africana* (Kyenkyen), *Ficus elastica* (Gyedua), *Chromolaena odorata* (Siamese weed) and *Trema senegalensis* (Osesea).

Forb regrowth

They consist of soft-stemmed leafy herbs, which get established on abandoned farmlands. Once the farm is abandoned, these quickly establish themselves and form a dense of foliage 1.2 meters or higher and vary in age from one to two years. Remnants of food crops are usually present as well as coppice shoots growing from stumps of felled trees. The regrowth are dominated by *Chromolaena odorata, Trema senegalensis, Aspilia latifolia* (Mfofo) and remnants of food crops including cassava, cocoyam, plantain, banana and pawpaw.

Elephant grass stand

Occupying more then a quarter of the Search Area is a large expanse of pure stand of tall elephant grass (*Saccharum spontaneous*) on the alluvial flats of the Tano River. This waterlogging prone-land has scattered small parcels of cultivated farms of legumes, vegetables, oil palm, plantain, cassava, oil palm, teak and chewing sugarcane. Tall emergent trees of oil palm, Cola gigantia var glabbrenscens, *Ceiba pentandra, Bombax buonozopense*, and *Triplochiton screloroxylon* are common.

Plantation crops

Plantation crops within the area include those of cocoa (*Theobroma cacao*), oil palm (*Elaeis guineensis*, teak (*Tectonia grandis*), plantain (*Musa spp*) and citrus.

Within and around townships, villages and farmsteads are few trees of citrus, coconut, colanut, teak, Gmelina, Indian almond, pear, pawpaw, bananas, Astonia, Baobab, mangoes, guava and avocado pear.

APPENDIX II

1.0 GENESIS OF THE SOILS OF THE AREA

Soils of the area have been formed through the interaction of five factors of soil development including climate, parent rock materials, living organisms, relief or topography and drainage and time or age during which these factors and their processes have been in operation. The soils have been formed to their present conditions through the actions of climate mostly rainfall and temperature on existing geological materials with the active participation of living organisms (vegetation, animals and man) on different relief

and drainage conditions over various periods of time. The major similarities and difference in the soils of the area are mainly due to these five factors of soil formation whose major roles have been discussed as follows:

Climate

Climatic elements, especially, temperature rainfall and humidity have played a major role in the formation of the soils of the area. The prevailing high and constant mean temperatures (26.60°C) coupled with the relatively high rainfall regime (1560mm) falling in two major seasons in a year, have given rise to the soils which are deeply weathered and highly leached of the bases. Most of the soils are depleted of the bases from which the essential plant nutrients are obtained. The soils have also become acidic in reaction and are composed mainly of kaolinitic clays and resistant quartz gravels and stones and sesquioxide minerals of iron, aluminium and manganese which have given rise to the relatively infertile soils. The stream and river valleys and the flood plains of the Tano River become waterlogged and flooded in the wet season but become droughty and cracking during the dry season.

Parent materials (geology)

The major physical and chemical differences among the soils of the area are due to the influence of the underlying parent materials from which the soils have been formed. These differences are with respect to inherent fertility, texture and moisture contents. Soils developed over the Lower Birimian rocks are rich in bases and medium to heavy textured with high moisture retention capacity, whereas those developed over alluvial deposits are heavy black clays, poorly drained with vertic properties.

Vegetation

The natural vegetation of the area falls within the moist semi-deciduous rain forest zone belonging to the Celtis-Triplochiton Association described by Taylor (1952). The original vegetation has been degraded through intensive timber harvesting and tree and food crop cultivation by the high population of the area.

The present vegetation of the area consists of secondary forest, thicket, forb regrowth and scattered farms of tree and food crops, except within the existing Forest Reserves where patches of high forest still occur. The major tree species encountered within the area are, *Celtis mildbraedii*, *Antiaris Africana, Chlorophora excella, Ceiba pentandra, Afelia Africana, Triplochiton scleroxylon, Ficus spp, Mallotus oppositifolius, Baphia nitrida, Trema senegalensis, Elaeis guineensis, Terminalia spp, Alchornia cordifolia, combretum spp. Aspilia latifolia, Widelia africana.*

Under such forest environment there is constant leaf and litter falls which decompose and be incorporated into soils increasing the amount and depth of the organic top layer and micro and macro-organism populations. The soils are covered by the vegetation in most areas preventing erosion and keeping them moist for a long time.

Living organisms

Vegetation, animals, man, micro and macro soil organisms are living organisms whose activities have contributed greatly to the formation and conditioning of the soil resources of the area.

Soil organisms such as fauna and flora and macro-organisms like worms ants and termites, are capable of altering the structure and porosity and consistence of the soils. These organisms are active under the prevailing moist forest vegetation resulting in well developed granular and crumbly upper layers of the soils. Some organisms also assist in fixing and releasing nitrogen from leguminous crops to enrich the fertility of the soils.

Human activities

Human activities such as farming earth moving, timber exploitation and deposition of wastes materials within the area have contributed to different soils of the area. Man's activities can be destructive such as inducing soil erosion and infertility by removal of vegetative covers and no external input farming or soil improvement by dumping of organic waste materials and proper farm management. The area is highly populated with farming as the main occupation.

Relief and drainage

Relief and drainage collectively exert tremendous influence on soil formation. Differences in soil conditions were observed along the various topographical sites from the summits to the valleys. On the summits and upper slopes, the soils were found to be well drained, red in colour and concretionally stony and gravelly. As drainage deteriorates down slopes, soil colours change from red to brown becoming moderately drained on the middle slopes, yellow brown, and imperfectly drained on the lower slopes to finally grey, highly mottled, poorly to very poorly drained within the valley bottoms.

Time and age

The age of a soil or the time it has taken the factors and processes of soil formation to act for it to develop is also very important in the genesis of the soil. Mature soils have had a long time to develop and have the three distinct genetic major horizons, A, B, C well developed. The very young soils occurring within the valley bottoms and the floodplains are made up of only AC horizons.

Immature soil like Awaham, Birim and Oda series have only AC profiles and are considered young soils since weathering has not proceeded long enough for the development of the A,B and C horizons characteristic of mature soils, because of frequent removal and deposition of fresh alluvial materials.

2.0 GENERAL DESCRIPTION OF THE SOILS

2.1 Soils developed over Lower Birimian Rocks

Bekwai Soil Association

The soils of this association are the most extensive, covering over 80% of the Search area. They cover the southern, middle and the northern portions around Kenyasi 1 and 2, Kwakyekrom, Ntotoroso and Wamahiniso. The soils are generally heavy textured and acidic in reaction. On summits and upper slopes of uplands and ridges (Units 1 and 2) the soils are deep to moderately deep ((75 – 150 cm), red to reddish brown in colour, well drained, moderate to strong, medium to coarse granular and sub angular blocky structures. The subsoils contain ironstone and quartz gravels and stones. Throughout the units sheets and boulders of ironpan are commonly exposed or at shallow depth. The middle to lower slopes carry soils (Unit 3) that are deep to very deep (over 150 cm), moderately well to imperfectly drained, free of gravels and concretions, yellowish brown in colour and mottled in deeper layers. Textures of these soils vary from loam at the topsoils to clay loam and clay in the subsoils. Structures are moderate medium granular within the topsoils and moderate medium to coarse subangular blocky in the subsoil. The valleys of streams and rivers carry very deep (over 150 cm), poorly drained, very dark grey topsoils to grey subsoils strongly mottled dark yellowish brown to yellowish brown. The soil types of the association encountered within the Search area were Bekwai, Nzima, Kokofu and Oda series.

Bekwai series (Hapli-Rhodic Acrisol; Typic Rhodustult)

These soils are found on summits and upper slopes of gentle rolling and undulating topography. They are not extensive in the Search area and only occur on ridge summits below south and southwestern Kenyasi 1. These soils are generally dark red in colour, well-drained, deep to moderately deep (75-150 cm) developed *in-situ* with clay loam to clay textured topsoils and clay subsoils. The topsoils have medium to coarse granular structure and the subsoils are of moderate to strong medium to coarse subangular blocky showing illuvial clay accumulation. The subsoils are gravelly and stony. A typical profile of Bekwai series

consists of topsoils of 8 – 20 cm thickness with humus-stained, dark reddish brown to brown, loam to clay loam, weak medium granular structure containing few ironstone and quartz gravels. Fine and medium roots are common within the topsoils. The subsoil are thick (120-150 cm) with dark red to reddish brown in colour, clay loam to clay textures, massive, firm, sticky, moderate strong, medium to coarse subangular blocky, with common to abundant ironstone and quartz gravels and stones. Quartz veins are encountered in some subsoils. The substratum is deeply weathered, red in colour with yellowish mottles, silty loam with few concretions and pieces of decomposed phyllite.

Nzima series (Chromi-Hyperferric Acrisol; Typic Paleustult)

These soils are normally found below Bekwai series on upper and middle slopes and may also be found on summits of low-lying uplands and ridges where Bekwai series are absent. They resemble Bekwai series in morphological characteristics but less well-drained internally and paler in colour. These soils are deep (over 150 cm), well-drained, yellowish red to dark red, clay loam to clay in texture with well developed angular and subangular blocky structures. The profiles of Nzima series consist of a relatively thin topsoils of up to 10 cm thickness, dark brown to dark reddish brown in colour, weak medium granular with few fine ironstone and quartz gravels and common fine and medium roots. The subsoils are thick (120 -150 cm), yellowish red to red in colour, clay in texture and massive, firm, sticky with moderate to strong medium to coarse subangular blocky structure. Abundant ironstone and quartz gravels and stones are found embedded in the subsoil. The substratum are encountered at great depths.

Kokofu series (Hyperplinthi-Haplic Acrisol; Typic Plinthustult)

The soils are found developed in hill wash colluvial materials on middle to lower slopes sites and in upland depressions. They are very deep (over 150 cm) yellowish brown to yellowish red, imperfectly drained, clay loam to silty clays, weak medium subangular blocky, free of concretions and gravels. A topical profile of the series consist of a thick (15 – 20cm) topsoil with dark grayish brown to dark yellowish brown colours, moderately well to imperfectly drained, loam to clay loam textures, weak fine and medium granular with no concretions and gravels. The topsoils are underlain by thick (over 150 cm) subsoils with yellowish brown to yellowish red colours, mottled gray, massive, firm, non-concretionary, non-gravelly, clay loam to clay, with weakly developed subangular blocky structure.

Oda series (Hapli-Eutric Fluvisol; Vertic Ustifluvent)

These soils occur along valleys of Sumansua, Kwamiasua, Asundaa, Ababusua, Awonsu, Kafrasu, Asuade and Ntotro Rivers and their adjoining streams. The soils are very deep (over 200 cm), poorly drained, sandy to clay in texture with black to gray colours. They are subjected to flooding and waterlogging during wet period and may dry deep in the major dry seasons. They are strongly mottled throughout the profile. They have thick topsoil (10-20 cm) with black to very dark gray mottled colours: humous-stained with rusted root channels and weak fine granular, sand to loam textured, without concretions and gravels. The subsoils are thick (over 160 cm), dark gray to yellowish brown, strongly mottled yellowish brown and dark red, clay loam to clay and silty clay, plastic, sticky, structureless with few ironstone and quartz gravels. Patches of pure sandy soils with rounded quartz gravel and stones (Temang series, Dustric Fluvisol) and very deep fine sandy soils (Chichiwere series, Gleyic Arenosol) may be encountered within the Oda series.

2.2 Soils developed over Tano River alluvial deposits

Birim-Chichiwere Soil Association

These soils have been developed on the wide alluvial deposits of the Tano River boardering the north-eastern portions of the Search area east of the Kenyase/Ntotoroso road. The Association consists mostly of heavy textured hydromorphic soils. The series members encountered within the area were Awaham, Birim and Chichiwere series.

Awaham series (Skeleti-Vertic Cambisol; Fluventic Dystrustept)

The soils are very deep (over 150 cm), very dark gray to yellowish red, strongly mottled strong brown, hydromorphic soils on extension and flat plains with pure stand of elephant grass. Abundant rounded quartz gravels are stones are embedded in the subsoils. They have topsoils of (10-20 cm) thickness, very dark gray to dark brown mottled strong brown, humus-stained, loam and weak fine granular structure with many fine roots. The subsoils are thick (over 80 cm), light yellowish brown to gray, weakly developed structure with abundant rounded quartz gravels and stones. The subsoils are strongly mottled reddish and strong brown.

Birim series (Eutri-Pellic Vertisol; Typic Haplustert)

The soils occur along the Tano River developed on recent alluvial deposits on low lying terrace lands. They are very deep soils (over 150 cm), dark grayish brown to yellowish brown strongly mottled strong brown and yellowish red. They are poorly drained with varied textured layers of sandy clay. The subsoils are firm, massive and structureless. The relatively thin (5-8 cm) topsoils have dark grayish brown to olive brown colours, humous-stained, loam to clay loam textures, and weak medium granular structure with many fine roots. The subsoils are thick (over 120 cm), brown to reddish brown strongly mottled pale and strong brown and yellowish red, firm, massive and structureless.

Chichiwere series (Endogleyi-Dystric Arenosol (Aquic Ustipsamment)

These soils are located on raised recent terraces along rivers and streams. They are very deep, loose sand with thin loamy, weak fine granular topsoils overlying very thick (150 cm) gray, mottled, structureless sandy subsoils.

APPENDIX III

The major agronomic practices recommended for successful farming and gardening are:

Soil Fertility enhancement

The soils are inherently infertile and judicious use of both organic and inorganic fertilizers, especially phosphate and nitrogenous fertilizers, will help to boost yields. Planting of leguminous crops, such as mucuna, will not only fix nitrogen in the soils but will serve as effective cover crop and a good source of organic matter to improve soil conditions.

Organic matter is the main source of plant nutrients and improvement of soil structure stability and provision of micronutrients. Organic matter enhances build up of soil microorganisms that aid in soil fertility build-up.

The main sources of organic matter are animal droppings, especially poultry manure and cow, goat and sheep dung. Legumes, such as mucuna, groundnuts, stylosanthes are good sources of organic matter. In compound gardens, household organic refuse is another cheap and good source to improve soil fertility and soil physical conditions.

Soil Erosion control

The soils are highly susceptible to accelerated erosion-especially the topsoils, which are light, textured and have mostly weak fine and medium granular structures. Apart from the high erodibility of the soils the rainfall has very high erosive potential. Sheet erosion can easily be induced. Effective anti-erosion measures such as mulching, cover cropping and land preparation along the contours and planting on ridges and mounds are necessary to prevent erosion if the lands are to be used for farming and gardening for a long period and to have constant high yields.

If topsoil materials are allowed to be eroded, exposing the subsoil plinthite materials, which have developed in the subsoils of all the soils, they may harden irreversibly into ironpan (petroplinthite) and degrade the soil permanently.

Soil Moisture retention

The soils of the Search Area are well to moderately well drained and have high percolation rates. They also have high contents of gravels and stones. Organic matter content is low in these soils. Evaporation from these soils is high. Water retention is therefore low especially in the dry season and the area may even become dry soon after rainfall. The need therefore exists to cover the surface and prevent erosion by using mulch and cover cropping as well as watering gardens and farms regularly. These practices will also contribute to the prevention of subsoil hardening from plinthite. Drip irrigation, if it can be provided, should be practised.

Pest Control

Garden vegetables and compound farm crops are susceptible to serious pest and disease attacks. Integrated pest management practices must be adopted to control the pests and diseases in order to prevent field and post harvest losses of the crops.

Irrigation

The dark heavy clay soils of the Tano river alluvial flats occupied by elephant grass stand can be used for the commercial production of rice, sugarcane and vegetables as prescribed by Brammer (1962) and Asiamah (1985). Effective soil water management must be practised for sustainable production of these crops.

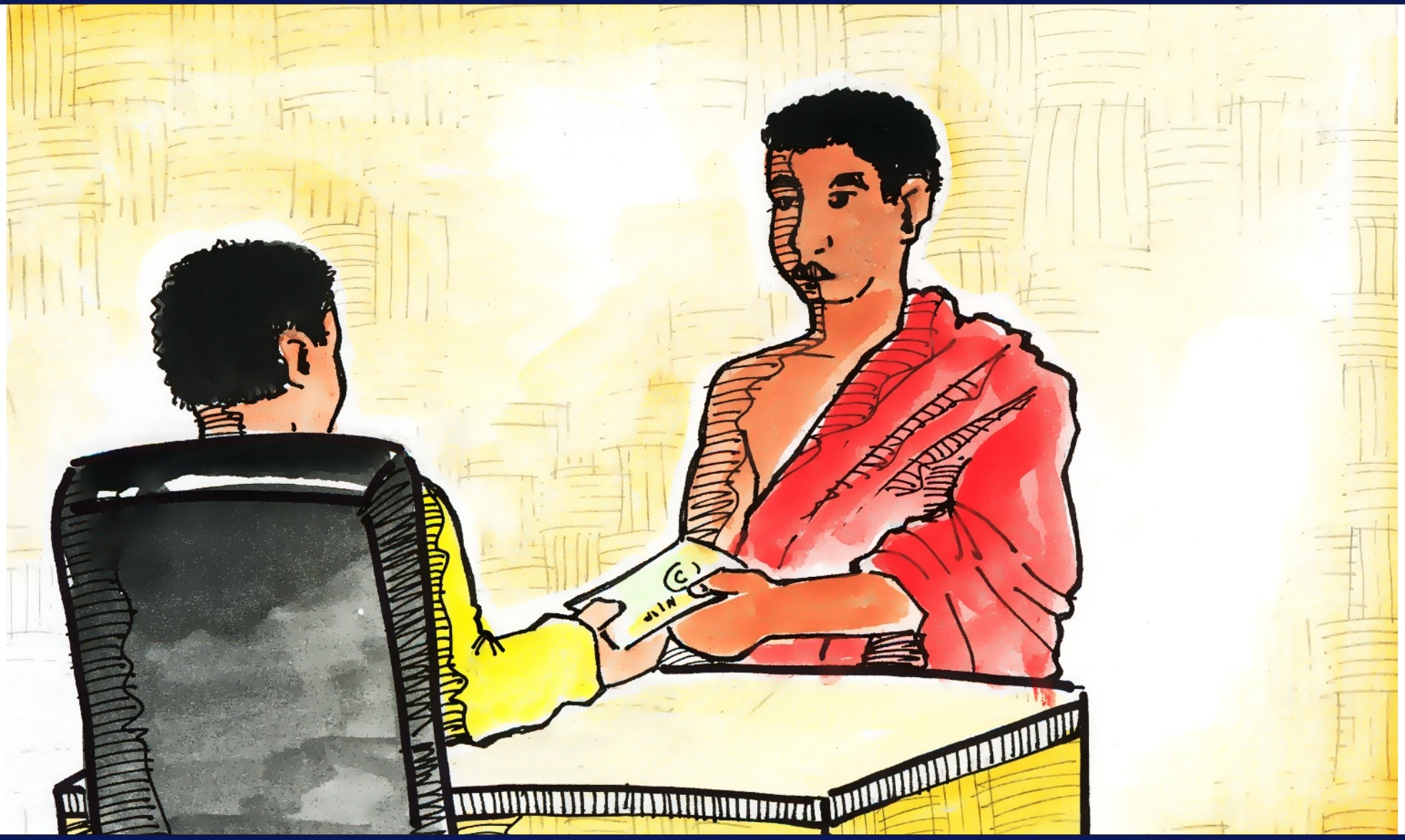
ANNEX L

COMPENSATION, RESETTLEMENT AND RELOCATION

Creating Value With Every Ounce

NEWMONT GHANA

Flip Chart 1



FLIP CHART 1:

QUESTIONS

What do you see in this picture?
What do you think the money is being paid for?
Do you know situations for which the company has had to pay money to people?
Name some of these situations?

COMMENTS

Compensation is what the company pays or provides in respect of properties that are impacted by the company’s operations.

Flip Chart 2

FLIP CHART 2:

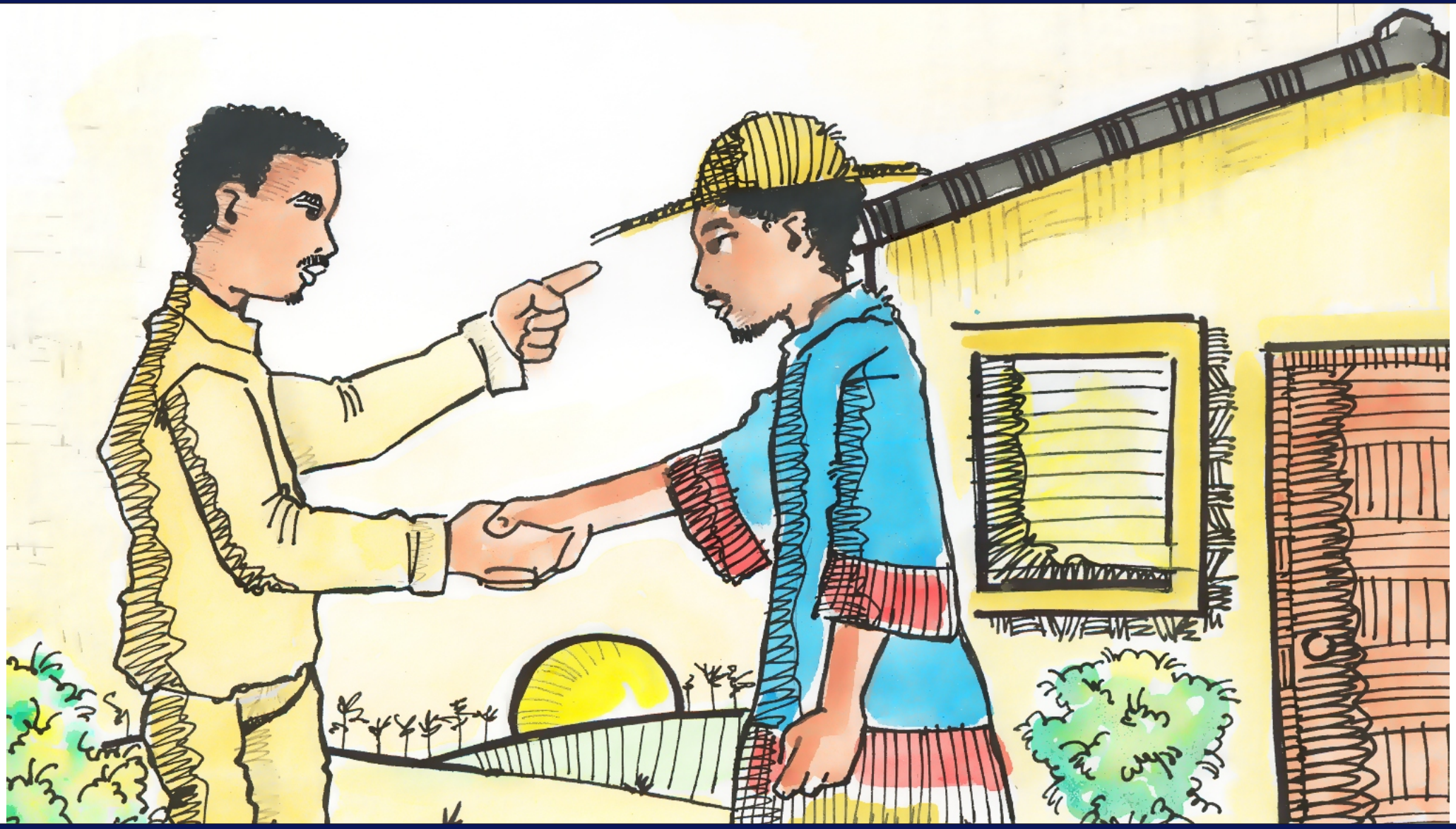
QUESTIONS

What do you see in this picture?
Have you or anyone you know been affected through Newmont's operations?
In what ways have you been impacted?
Has any company official visited your farm to discuss how you may be impacted by the mining project?
What was involved in the discussion?
Do you know that you will be compensated for any crops impacted?

COMMENTS

You will receive crop compensation for your lost crops. This will be determined by an independent value to ensure that you receive all that is due you. Crops are valued according to type and age.

Flip Chart 3



FLIP CHART 3:

QUESTIONS

What do you see in this picture?
Briefly describe what you see in the picture?
Have you been affected by the Newmont resettlement scheme?
Do you like your current location?
What do you/don't you like about your current location?

COMMENTS

Sites are being prepared to resettle all persons whose settlements have been destroyed as a result of Newmont's activities. Through dialogue, you will be provided with an acceptable residence outside the mine take are.

Flip Chart 4

FLIP CHART 4:

QUESTIONS

What do you see in this picture?
Have you had to move from your location
What process was used to do this?
Do you like this process?
Tell us about this process?

COMMENTS

As someone to be located by Newmont, you must have already moved from your affected residence in the Mine Take area and have settled elsewhere in an acceptable residence. Newmont will facilitate this process for you by giving you transport and mobilization package.

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