LOSS OF FOREST COVER AND ITS SOCIO-ECONOMIC IMPLICATIONS:

A CASE STUDY ALONG THE OFFIN RIVER BASIN OF THE ASHANTI REGION

BY

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Ghana Map

Burkina Faso

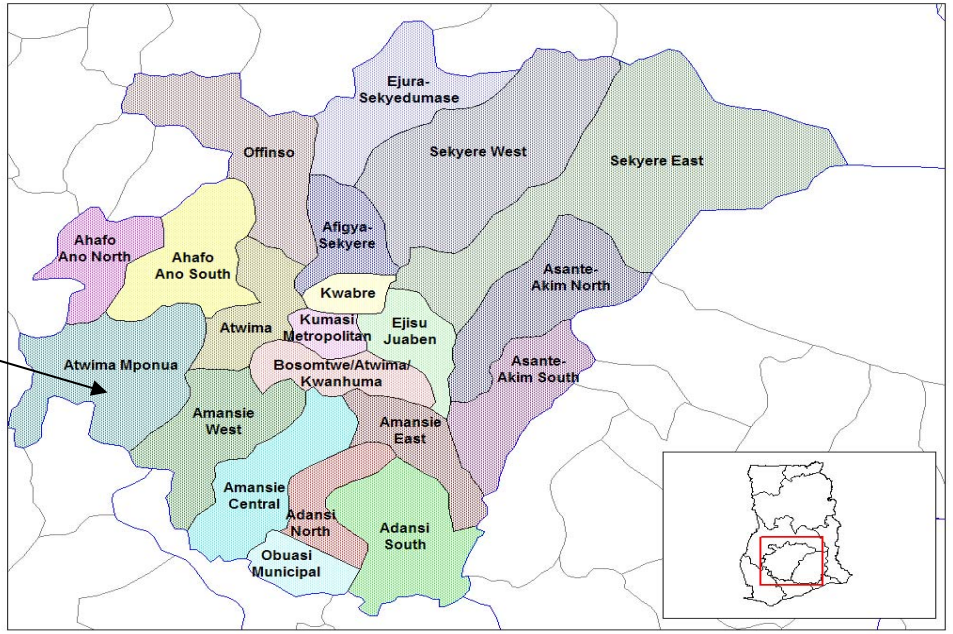
Ivory Coast

Togo

Gulf of Guinea

Ashanti Region

Study Area



Administrative Districts of Ashanti Region

Outline

- INTRODUCTION
- MATERIALS AND METHODS
- RESULTS AND DISCUSSIONS
- CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

- Ghana possesses a system of forest reserves which is second to none in the West African sub-region: forests rich in prime timber spp, serve critical environmental functions and uniquely, this heritage still belongs to the traditional land-owning communities

- The Ghanaian society continues to enjoy the multiple benefits of this resource i.e. secure water resources and fertile soils, revenues to support local development, job creation, etc.

- However, forests all over the globe are dwindling at a faster rate with the reported loss of tropical rainforest at a rate of 15.2 million ha/yr (FAO, 2001).

- Loss of forest cover due to anthropogenic factors presents enormous challenges to vulnerable forest dependent communities in terms of water supply, health, food security, employment and shelter.

INTRODUCTION cont'd

- In Ghana, the rate of forest loss as at 1988 was 750km^2/yr (Upton, 2001)

- Forest cover is desirable in catchments and they are almost the best and most natural protection for streams (Kunkle, 1974).

- Hence any careless land use practices can lead to severe sediment problems, which impact great costs to both rural and urban communities (FAO, 2003; Brooks et. al, 1997; Kunkle, 1974).

INTRODUCTION cont'd

- Log extraction has consistently been undertaken in the Tano Offin and Offin Shelterbelt F/Rs and within the OFRs along the watercourse
- Loggers claim they maintain the prescribed stretch of unlogged land as buffer (50m/25m). Yet these rivers/streams have become irregular in flow
- It appears logging is not being conducted according to the standard practice. Consequently the livelihoods of the riverine communities may be negatively affected
- Therefore, there is the need to understand the effects of forest removal on river flow, water quality, etc. in order to develop appropriate prescriptions for sustainable and environmentally responsible logging

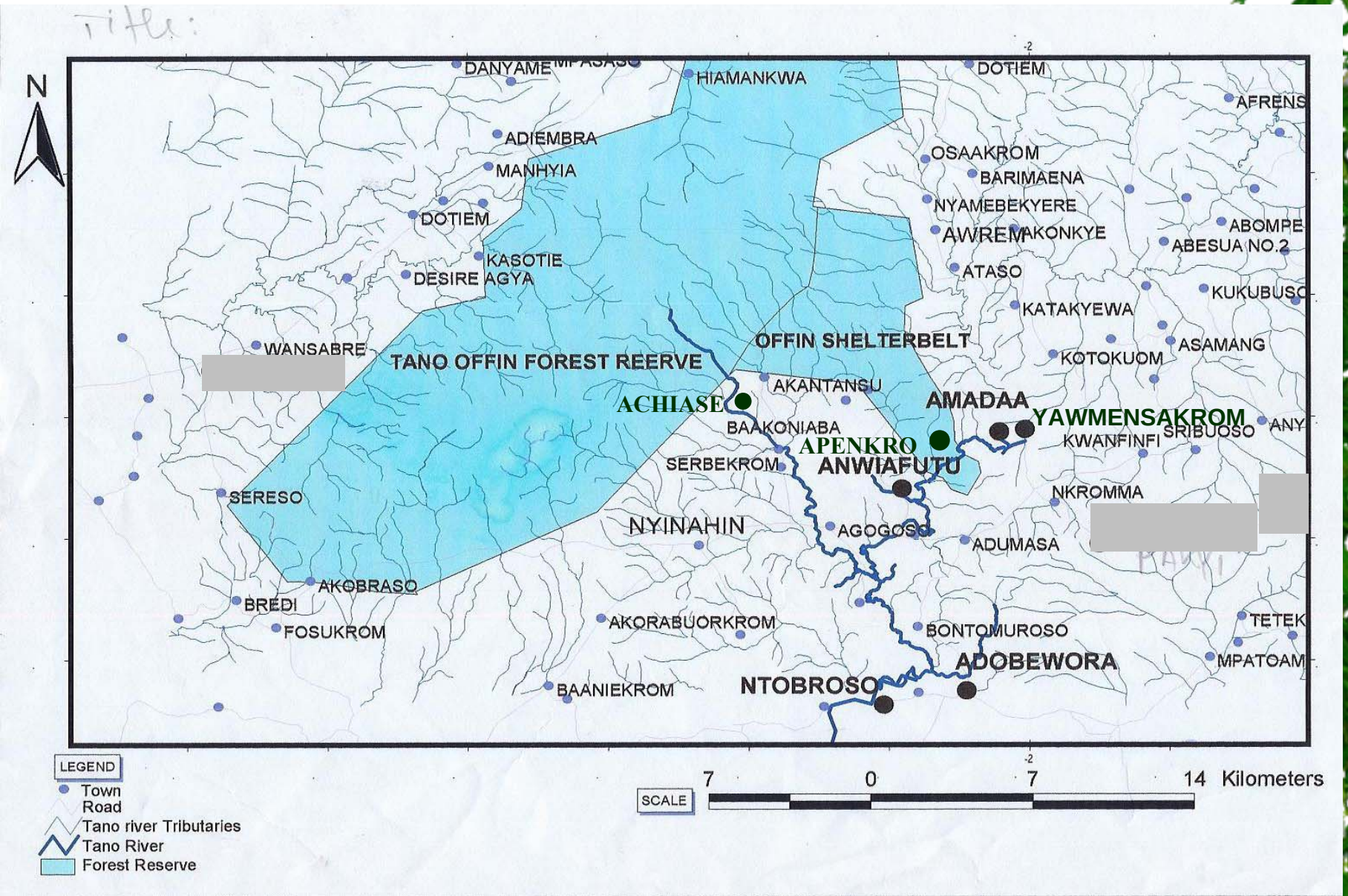
Objectives

1. To determine the percentage loss of forest cover due to logging in the Offin river portion in theTano-Offin and Offin Shelterbelt F/Rs

2. To determine the impact of logging on the social life (employment, health, food supply and water supply) of the people in the riverine communities

MATERIALS AND METHODS

Study Area



METHODS cont'd

Assessment of Logging Impact on the riverine communities

- **Questionnaire Administration**

  100 people were selected from the 7 communities by simple random method and interviewed using structured questionnaires covering:

  a) Personal data

  b) Change of forest cover and forest land use

  c) Effect of logging on domestic water use

METHODS Cont'd.

d) Effect of logging/farming on water quality

e) Effect of logging on farm activities

f) Compliance of logging rules

g) Impact of logging on forest fringe communities

The data so generated were analysed using cross-tabulation and descriptive statistics under SPSS (*Version 13.0*).

METHODS cont'd

Forest Change Detection with maps and satellite imagery

- Satellite images for 1990 and 2000 acquired and geo-referenced to Ghana co-ordinate system (TM Ghanafeet)
- Forests were classified from non-forest patches using Erdas imagene
- The classified image was subset by the 500m buffer on each side of River Offin

METHODS cont'd

Forest Change Detection with maps and satellite imagery

- Ground-truthing' exercise was undertaken to validate the classification
- The two images (1990 & 2000) were analysed and compared using a simple bar chart in Arc View to determine change over the 10 year period

METHODS cont'd

Forest Inventory of Tano-Offin and Offin Shelterbelt forest reserves

- Forestry Commission's (FC's) Temporary Sample Plots (TSPs) inventory data of Tano-Offin and Offin Shelterbelt for 1990 & 2000 were acquired

- FC's Permanent Sample Plots (PSPs) inventory data of Tano-Offin and Offin Shelterbelt for 1996 & 2001 were also acquired

METHODS cont'd

Forest Inventory of Tano-Offin and Offin Shelterbelt forest reserves

- Stand parameters i.e. stem numbers, volume, basal area per hectare were generated for the 2 forest reserves using Excel (TSPs) and Access (PSPs) programmes

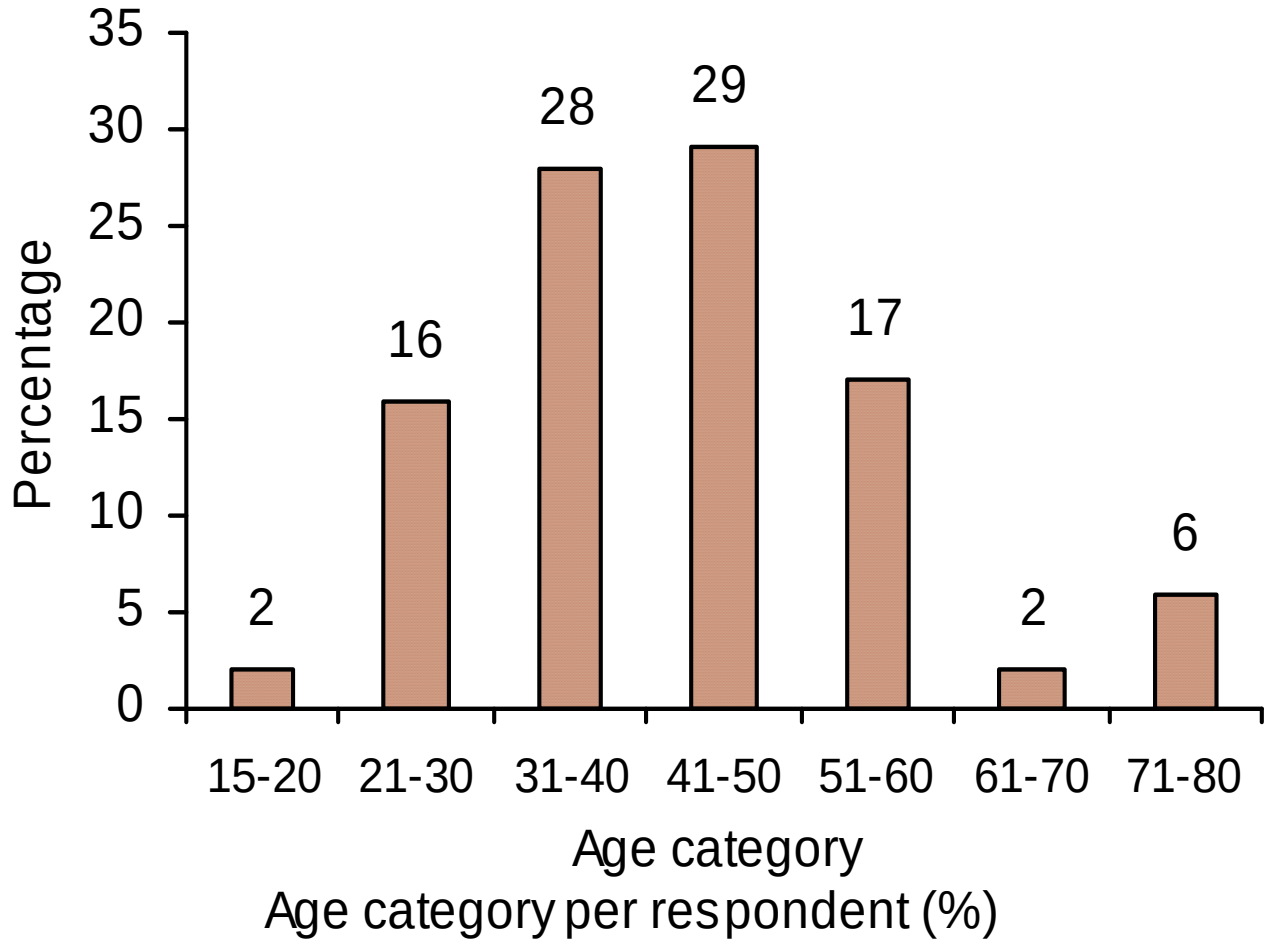
RESULTS AND DISCUSSIONS

DEMOGRAPHY

Out of the 100 respondents interviewed in the 7 communities 61% were males.

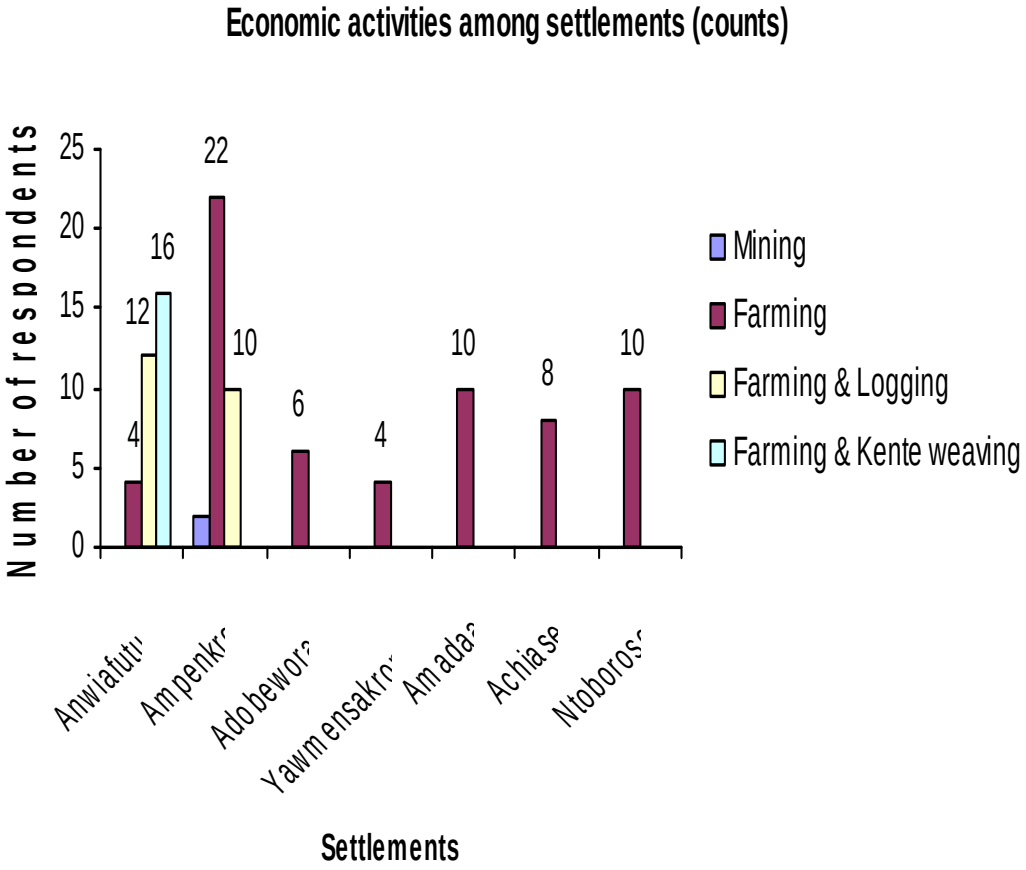
Additionally, 62.0% of the respondents were natives of the communities indicating relatively low population of migrant settlers.

Though a typical rural community literacy level was quite high (69%). Most people interviewed (79.0%) were married with household size of 4-6 numbers recording the highest frequency of 52.0%.

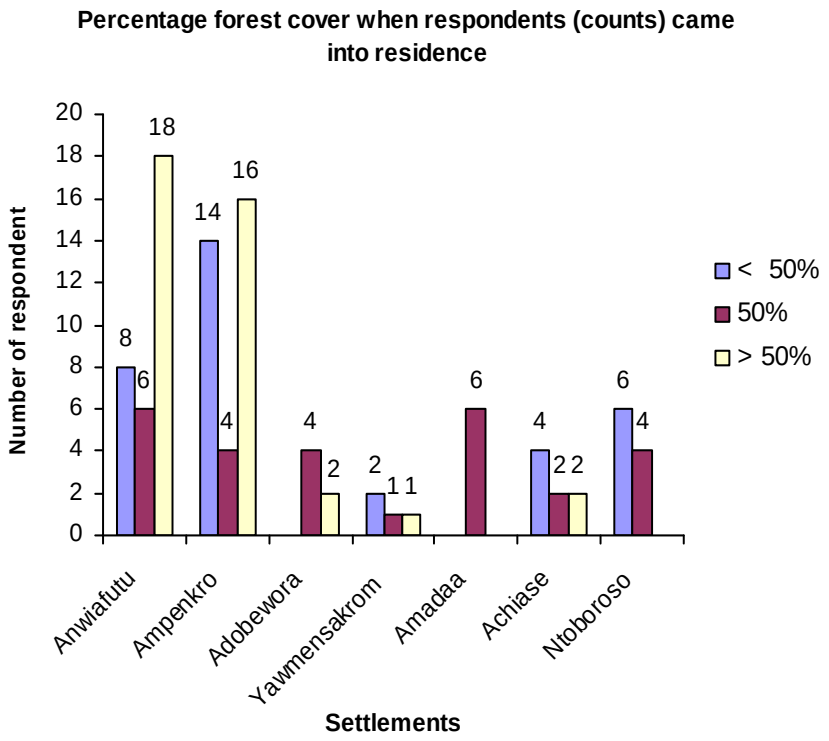


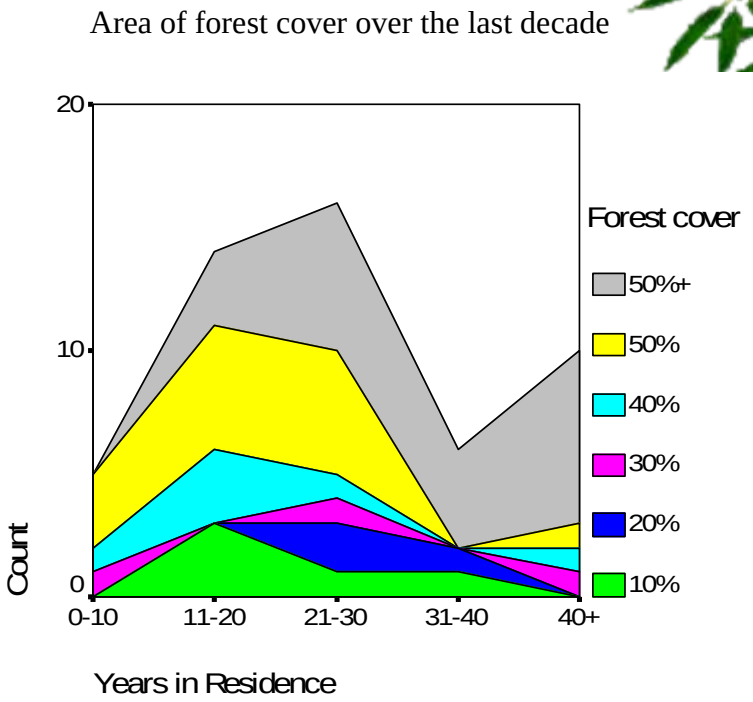
Age category per respondent (%)

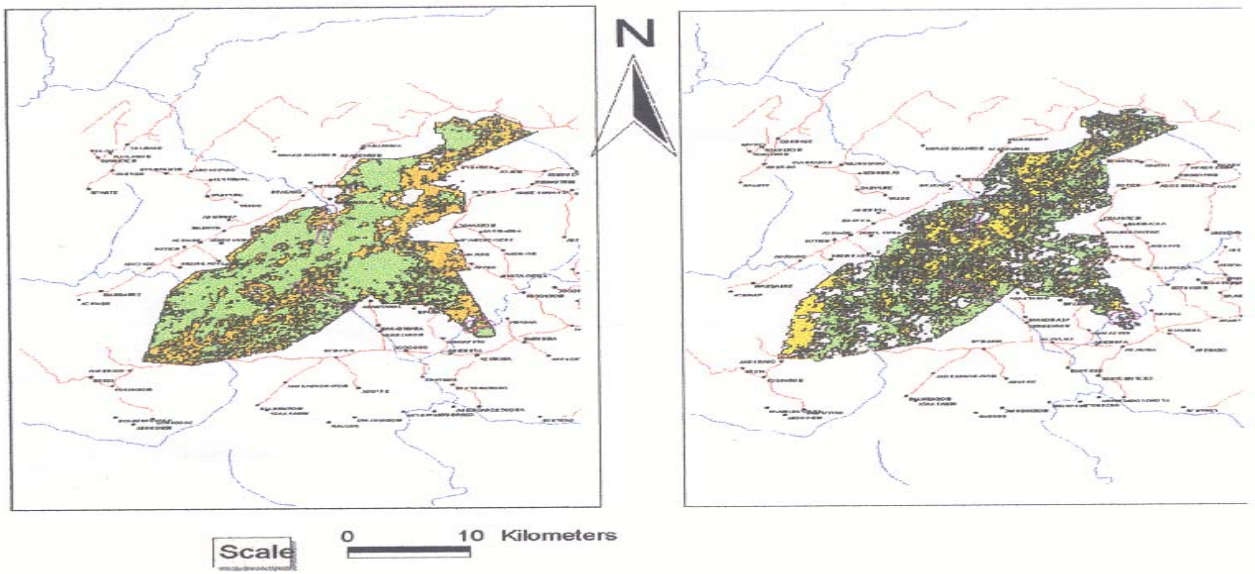
MAIN OCCUPATION AND AGE GROUP

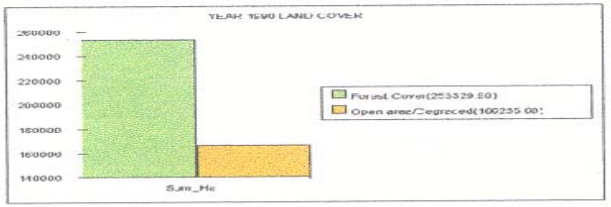


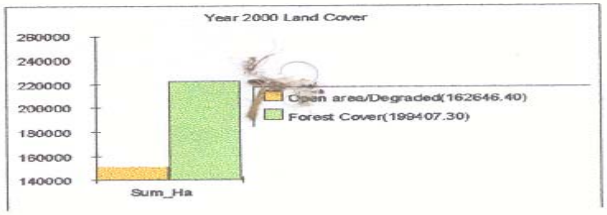
LOSS OF FOREST COVER











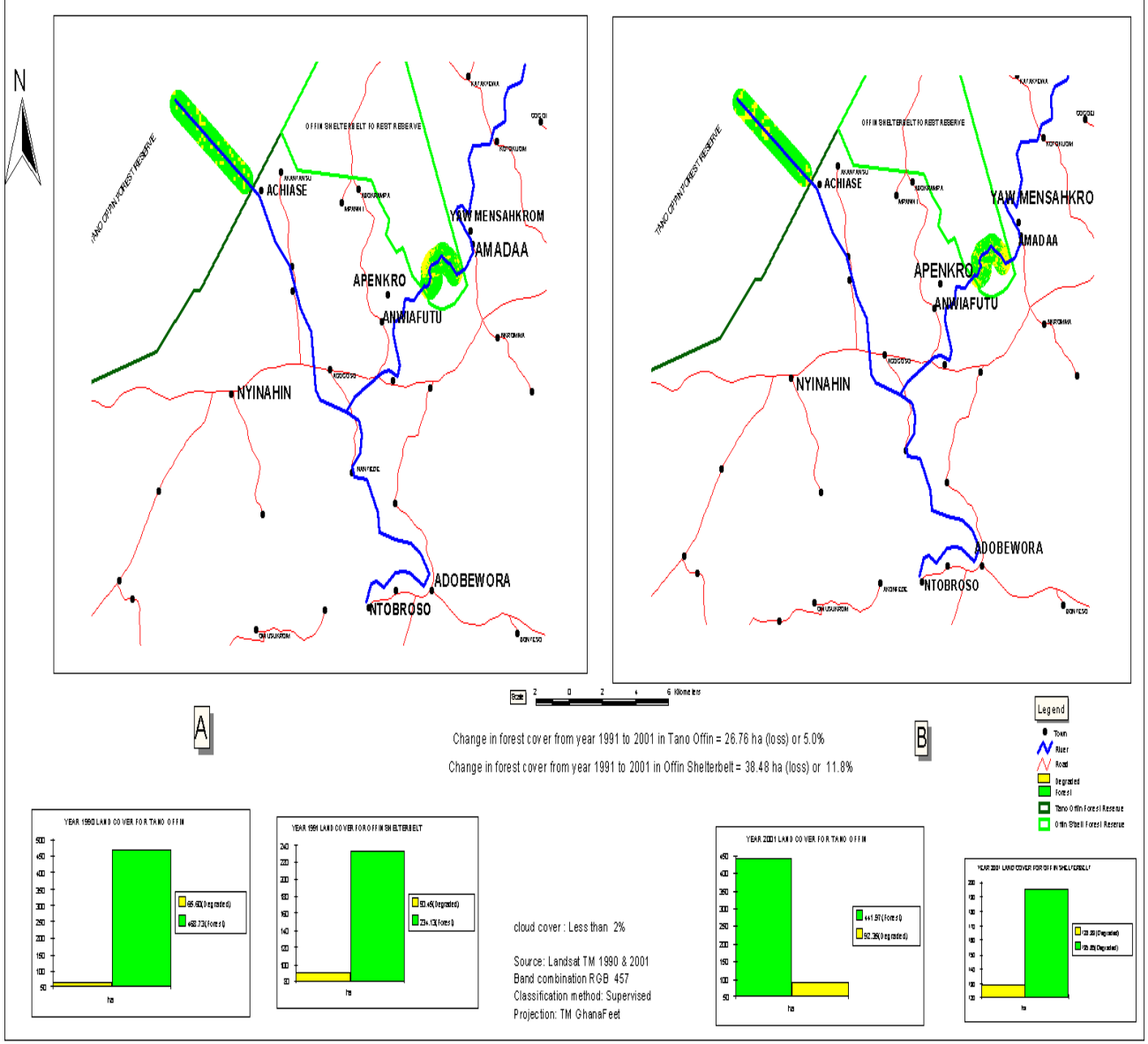
Change in forest cover from year 1990 to 2000 = 53922.6 ha or 21.3%

% Cloud Cover in 1990 = 11%
% Cloud Cover in 2000 = 23.3%

Source: LANDSAT TM YEAR 1990 & 2000
Band Combination RGB 457
Classification method : Supervised
Projection: TM Ghanafeet

Changes in forest cover from 1990-2000 = 509,220ha (21.3%)

Changes in forest area as detected from satellite image analysis of the Offin shelterbelt and Tano-Offin forest reserves.
Image Source*: LANDSAT TM 1990 & 2000*



Changes in forest cover in Tano-Offin from 1990-2000 = 26.76ha or 5.0% loss
Changes in forest cover in Offin S/belt from 1990-2000 = 38.48ha or 11.8% loss

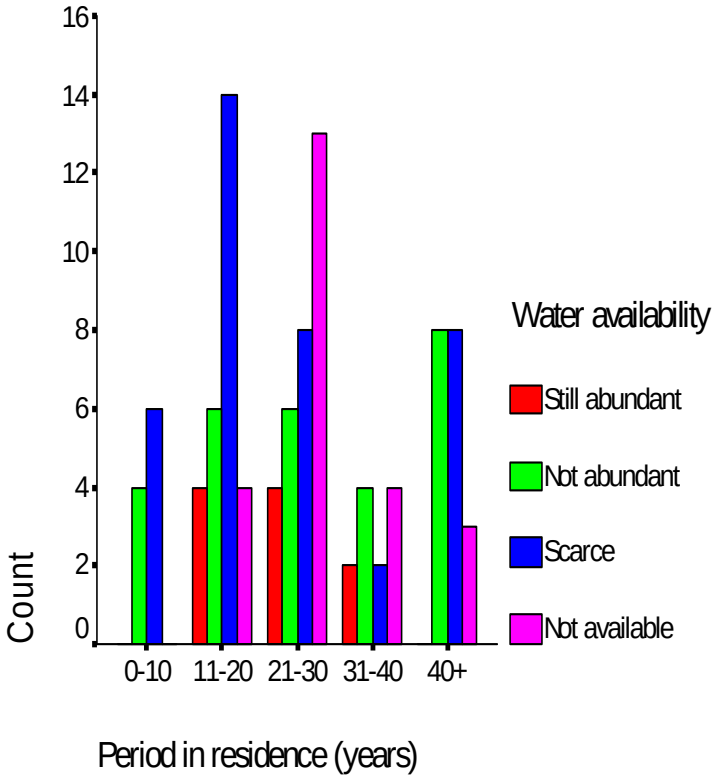
Changes in forest area in the buffer zones as detected from satellite image analysis.
Image Source: *LANDSAT TM 1990 & 2000*

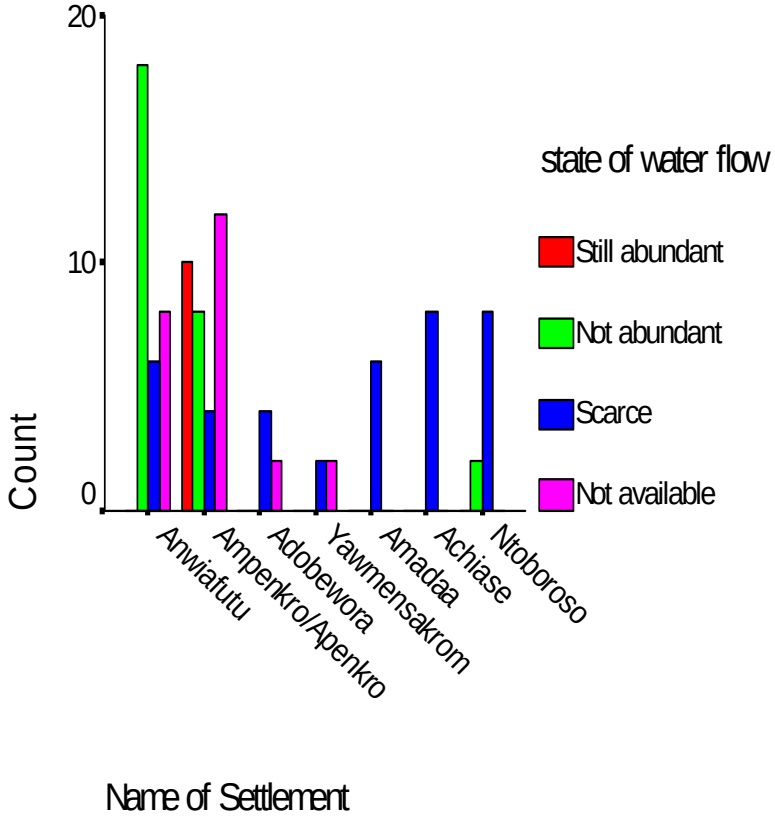
Comparison of % Rates of Decline in forest Conditions in Tano Offin And Offin Shelterbelt Forest Reserves Between 1990 And 2001

Forest Reserve	Area (ha)	Stem Numbers ha^{-1}	Basal Area (m^2 ha^{-1})	Vol. (m^3 ha^{-1})
Tano Offin	**40,220**	0.99%	2.76%	0.80%
Offin Shelterbelt	6,030	1.42%	2.92%	2.47%

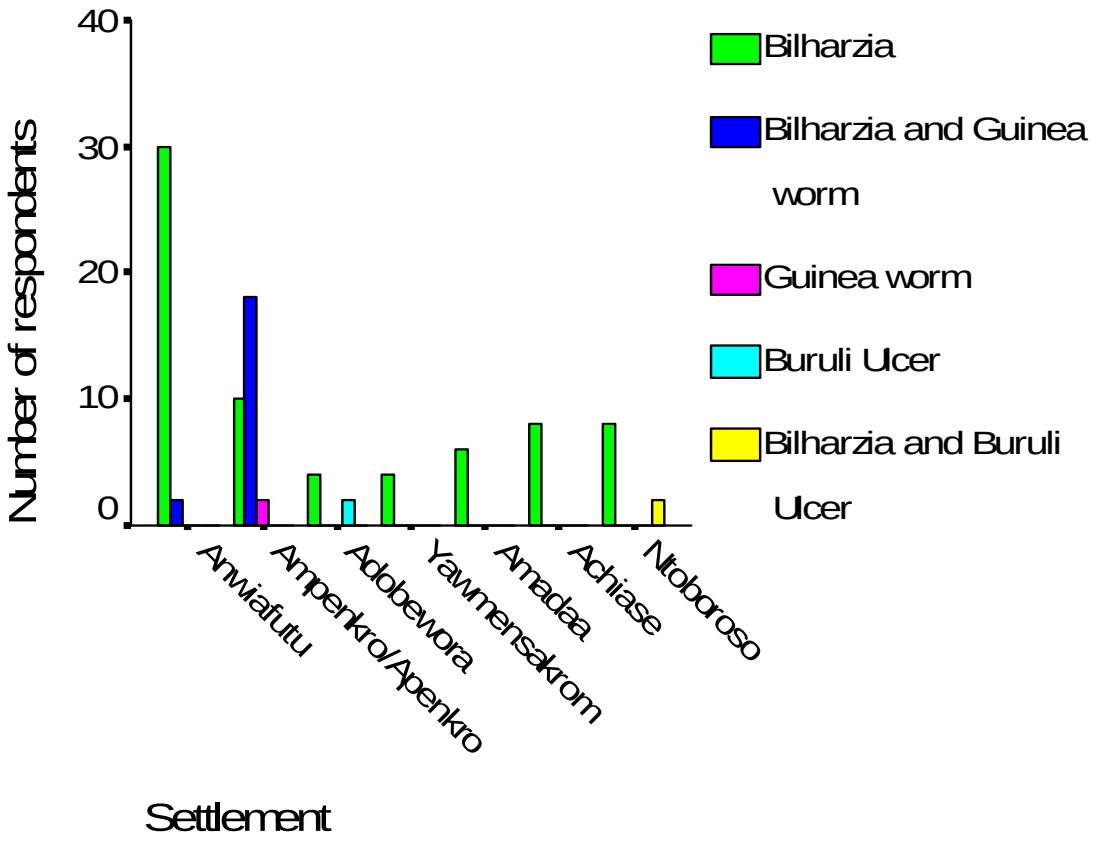
Source: Determined from inventory data of RMSC, Kumasi.

Residents' assessment of current stream flow as against when they first settled in the catchments





Incidence of water-borne diseases in the various settlements



EFFECT OF LACK OF WATER

The study site has experienced loss of over 20% of its forest cover due to intense cultivation, logging, mining activities etc.

Forests are important for sustaining man's supply of fresh water (Amanor, 1996).

This disturbing situation may explain the prevalence of **water-borne diseases** as well as the occasional **water shortages**.

CONCLUSIONS

- Significant loss of forest cover was due to farming and logging and to some extent mining. Farming and logging take place along river buffers both in the agricultural lands and within the forest reserves.

- The forest loss and bad land-use practices have impacted negatively on the regularity of stream flow and water quality. This is manifested in the high incidence of water-borne diseases in the seven study areas, with Apenkro community being the hardest hit.

CONCLUSIONS cont'd

- Forest loss had brought in its wake rural-urban drift, with farming being left in the hands of the aged (subsistence farming).

- Annual forest loss is higher in the Offin shelterbelt (0.79%/yr) than in the Tano-Offin forest reserve (0.3%/yr).

- Should the current trends/rates (i.e. uncontrolled logging, chainsaw operations, mining, NTFP harvesting, hunting, etc.) persist in the Offin shelterbelt, within the next 17yrs, the stocking level (basal area) shall reduce to < 5m2 ha-1 .

RECOMMENDATIONS

•Replicate study in all shelterbelts and watersheds to ascertain the extent of forest loss, biodiversity and their effects on streams and rivers.

•An environmental action is necessary to conserve the arable land, control logging in the Offin Shelterbelt and Tano-Offin forests reserves so as to deal with the polluted waterways that is likely to increase the cost of water treatment at the harvesting points.

Recommendations cont'd

- Identifiable groups especially women and the expertise and dynamism of environmental NGOs are crucial for the success of any initiated community project that seeks to address forest loss.

- Concerted efforts of the chiefs (being custodian of the land), the police, the judiciary and the District assemblies are very necessary to ensure the effective enforcement of environmental laws and regulations.

THANK YOU

FOREST STAND CONDITION

Stocking Levels Of All Trees ≥ 10 cm *dbh*

Tano Offin Forest Reserve

Year	Stem Nos./ ha	BA m^2/ha	Vol. m^3/ha	Source
1990	411	24.3	155.3	National Forest Inventory Results 1989/90
1996	398	18.9	150.7	Permanent Sample Plots Data 1996
2001	366	16.9	141.6	Multi Resource Inventory 2001/2002

Offin Shelterbelt Forest Reserve

Year	Stem Nos./ha	BA m^2/ha	Vol. m^3/ha	Source
1990	512	27.0	176.3	National Forest Inventory Results 1989/90
1996	466	18.2	139.5	Permanent Sample Plots Data 1996
2001	432	18.3	128.4	Multi Resource Inventory (2001/2002)

Source: Resource Management Support Centre (RMSC), Kumasi-Ghana