

# AN EVALUATION OF BUSH FIRE PREVENTION AND CONTROL POLICY IN GHANA

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## ABSTRACT

Bush burning has been part of the Ghanaian land use practice for years, but unfortunately, it easily gets out of control and poses problems of national dimension. In the wake of the bush fire destruction of 1983, the People's National Defence Council (PNDC) enacted the Bush Fire Prevention Law 46. This was later repealed by the Bush Fire Prevention and Control Law, 1990 (PNDC L. 229). The aim of this study is to evaluate the bush fire prevention and control policy in Ghana.

The Brong-Ahafo Region was selected for the study. Kokuma and Chirahini in the Kintampo district, and Woramuso and Amanfrom in the Asutifi district were randomly selected for the study. Bush fire and rainfall data were collected from Ghana National Fire Service (GNFS) and Meteorological Service Department respectively to facilitate quantitative analysis of the study.

Results of the Study show that despite the existence of the bush fire policy, incidence of bush fires has been generally increasing. This is mainly due to the culture of burning. The general compatibility of the bush fire policy was found to be encouraging. However there are external inconsistencies. After analysing the policy options, a number of shortfalls were identified. This includes, lack of appropriate mitigation measures, lack of major preparedness and low data and information requirements for effective monitoring and feedback. The Study again observed that there is no potency arrangement to co-ordinate bush fire activities at both the national and regional levels. As regards the formulation and implementation of the policy, it was found out that the communities were not involved in any way in the formulation of the policy, and Ghana National Fire Service (GNFS) also muddles through in the training of the Fire Volunteers. In effect, there is totally non-adherence to the tenets of the bush fire policy. The study again revealed that many Fire Volunteers are, however, discouraged from performing their duties as expected due to lack of legal defence, finance and other logistical support.

It is therefore, recommended that Central government should improve the existing bush fire policy.

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## ABBREVIATIONS AND ACRONYMS

D.A.	District Assembly
D.E.P.P.	Development Policy Planning
D.P.C.U.	District Planning and Co-ordinating Unit
D.S.A.	District Sectoral agencies
F.A.O.	Food and Agricultural Organisation
G.N.F.S.	Ghana National Fire Service
K.N.U.S.T.	Kwame Nkrumah University of Science Technology.
M.S.D.	Meteorological Service Department
N.A.B.F.C.	National Anti Bush Fire Committee
N.D.P.C.	National Development Planning Commission
N.E.P.C.	National Economic Planning Council
N.G.Os.	Non-governmental Organisations
N.L.C.	National Liberation Council
N.R.C.	National Redemption Council
P.N.D.C	Provisional National Defence Council.
R.C.C.	Regional Co-ordinating Council
S.M.C.	Supreme Military Council
S.S.A.	Sub-Saharan African

## CHAPTER ONE

### GENERAL INTRODUCTION

#### 1.1 Introduction

This chapter gives the background of the study. It elaborates on the processes and methods employed in formulating the problems and selecting instruments for analysing the problem. The chapter also considers the purpose of the study, the objectives, research questions and the rationale or justification of the study.

#### 1.2 Background to the Study

For many years people took for granted the environment in which they lived or depended (Nyerere 1985). That such an attitude is short sighted, became widely apparent when the extent of land degradation and desertification-related human suffering was exemplified by the widespread droughts that tragically affected the sahelian-Sudan region of the sub-sahelian Africa (SSA) between 1969 and 1972 (FAO 1985). Following the catastrophic sahelian drought and the Stockholm conference in 1972, scientists and other professional groups joined in the widening debate of the cause and global consequences of environmental degradation and desertification (UNCOD 1977). World public opinion has now been aroused by the extensive destruction of environmental resources by bush fires in recent years, and fears have been expressed that worldwide ecological and climatic consequences might result if this trend continues unabated (N. Gyabaa 1984). In the face of growing concern about deterioration in the food sector, rapid population growth, environmental degradation and accelerated desertification, many experts foresee a potential 'African crisis' and warn that unless there is a transformation of people's attitudes and uncontrolled biomass burning, many countries are going to be impoverished much sooner or sooner become desertified (UNCOD 1977).

Ghana's environmental problems are multifarious but the greatest concerns today are the effects of deforestation and bush fires on rainfall, water resources and soil structure (Mann 1989). Virtually, every facet of rural life in some way relies on fire. As long as Ghana's rural economy thrives, so will its bush fires (Ampadu-Agyei 1986). Thus, a

register of fire is a litany of rural life. Pastoralists burn to sweep away encroaching brush, cleanse a site of ticks, inhibit snakes, and to stock dormant grasses back to life. Their flocks crowd onto the fresh green fodder, which is more palatable and more nutritious than the unburned stalks. Farmers burn to clear fields. Local Languages encode the best time for burning into their names for the seasons. Twi calls February "Ogyefuo", literally meaning, "fire farm", Akwapims call it "Apambere", "time of collecting smouldering stems". Ewes, "Dzove", which means simply 'burn'. Hunters set fires to smoke rats out of holes and to both drive and draw game. Others burn to gather honey, using smoke to drive away the bees. Fire is again used for tapping of palm wine.

Villagers burn around their grass-roofed houses; farmers around still-unharvested crops; rice fields, and cocoa plantations; Priests around sacred groves and foresters around gazetted reserves during the dry season.

Virtually everything people do in the bush involves fire. Remove those enabling flames and human life would collapse (Pyne 1999). Surprisingly, these fires easily get out of control and bush fires pose problems of national dimension. Narrating environmental effects of bush fires in Ghana, Pyne (1999) writes;

*"Few things are fundamental to Ghana's national identity, and appropriately its flag records this environmental saga. Three bands of colour fill the field with a black star in the center. The bands rise from bottom to top, one leading to another in mimicry of year's cycle, Green, the season of rains; yellow, the time of dormancy; red, the fires that follow; the black star the ash and char that remains at the core of Ghanaian life and its ambiguous future"*

Source: Pyne (1919), Ghana with the wind. IFFN No. 21 – Sept. 1919, 2-11 pp

### 1.3 Problem Statement

No one can doubt that bush fire pervades in Ghana. But must it? Is bush fire natural and therefore necessary? Or is it the product of human contrivance; and therefore, least in principle, expugnable? Bush fires exist not only, or even primarily, because natural conditions favour it. Bush fires flourish because Ghanaians have put it there

The bush fires of 1982-83 and 1983-84 were particularly disastrous, they destroyed precious cocoa, food crop and timber, as well as a number of villages. During the 1982-83 dry season a Food and Agricultural Organisation (FAO) assessment team estimated that about 50 per cent of Ghana's vegetational cover and about 35 percent (or 154,000 metric tons) of standing crops and stored cereals were destroyed by the bush fires (FAO 1984). Complete statistics of the impact of the 1982-83 and 1983-84 bush fires season seem to be non-existent, but some patchy records on the impact of bush fires in the 1984-85 season shows that about 110 bush fire out breaks were reported in the Brong Ahafo Region, one of the leading cocoa and food crop producing areas in Ghana. (Ampadu-Agyei 1986.)

In the wake of the bush fire destruction of 1983, the Peoples National Defence Council (PNDC) enacted the Bush fire prevention Law, PNDC Law 46. This was later repealed by the Bush Fire Prevention and Control Law, 1990 (PNDC L.229). The law prohibits the setting of bush fires for any purpose other than certain agricultural, forestry and game management uses. The law also provides penalties for persons found guilty of violating its provisions.

It is thus believed that once a public policy has been made, implementation will follow orderly and automatically achieve the goals desired by the policy makers. Surprisingly, bush fires continue to rage very high. Data provided by Ghana National Fire Service (GNFS) indicated that 237 bush fire outbreaks were recorded throughout the country between 1990 and 1991. It increased to 480 in 1992 - 93 period. 731 in 1994-95. Between the period 1996 and 1997, 633 bushfires outbreaks were recorded, and fell to 361 in 1998/99 period.

Studies have shown that bush fires (with temperatures in excess of  $40^{\circ}\text{C}$ ) are detrimental because they completely destroy the soil organic matter and reduce the cat ion exchange capacity. They result in serious damage to flora, fauna and neighbouring property (Nsiah-Gyabaa 1994). The long term insidious effect of bush fires have now reached a point where the West African sub-region is a threatened zone for desertification and it is the major factor leading to deforestation ( Albin Korem, 1986). There is an emergence of pockets of parklands even in the forest zone (Ampadu-Agyei, 1986).

#### 1.4 Justification of the Study

Incidence of bush fire is high in the country. They have rendered vast tracts of land barren of vegetation and imposed a potential for desertification. These and many more problems bear witness to the inadequacies in the bush fire legislation and other related measures.

The study will review the existing bush fire policy to see if it is still;

- i. Appropriate and relevant
- ii. Being observed and enforced, and
- iii. If it is achieving expected results.

#### 1.5 Research Questions.

The following research questions form the basis of the study:

- i. Are there built-in-checks and balances governing the use of fires in the bush?
- ii. Are the citizens aware of the existence and what the law entails?
- iii. What scope exists for inclusion of grassroots people in the formulation and implementation of bush fire laws?
- iv. Is the policy adequate enough to meet the needs of the policy makers?
- v. Why is bush fire phenomenon still rampant in Ghana despite the country's concerted effort at curbing it?

## 1.6 Goals and objectives of the Study

The purpose of the study is to evaluate bush fire prevention and control policy in Ghana and to recommend interventions that would ensure effective management of Ghana's bush land.

Specifically, the research objectives include;

- i. Examine trend of bush fires.
- ii. Review bush fire policy s.
- iii. Ascertain levels of participation of communities/target groups in the formulation of the bush fire policy.
- iv. To assess the implementation of the policy.
- v. Identify the problems associated with the implementation of the policy and make recommendations towards effective implementation to achieve the goals desired by the policy makers.

## 1.7 Research Hypotheses

The hypotheses for this study are as follows:

- i. There is a positive relationship between inappropriate government policies and occurrence of bush fires.
- ii. Promotion of community participation in the formation of bush fire prevention and control laws, contributes substantially to bush land management.

## 1.8 Scope of the Study

The Brong Ahafo Region was used as the case study, and the study covered a ten (10) year time frame ranging from 1990 to 1999.

### 1.8.1 Case Study Area And Justification

#### 1.8.1.1 Location and Size

The Brong Ahafo Region is located within Latitude  $8^{\circ} 40'$  and  $7^{\circ} 30'$  North of the Equator and Longitudes  $0^{\circ} 15'$  East and  $3^{\circ}$  West. It covers an area of about  $39,557\text{km}^2$ , which constitute about 17 percent of the total land area of Ghana.

Approximately 20.7 km<sup>2</sup> of the land is inundated by the Volta Lake. The region shares boundaries with the Ashanti Region on the south, on the South West with the Western Region, with the Volta Region on the East, the Eastern Region on the southeast and Northern Region on the North. Figure 1.1 shows the location of Brong Ahafo Region within the context of Ghana.

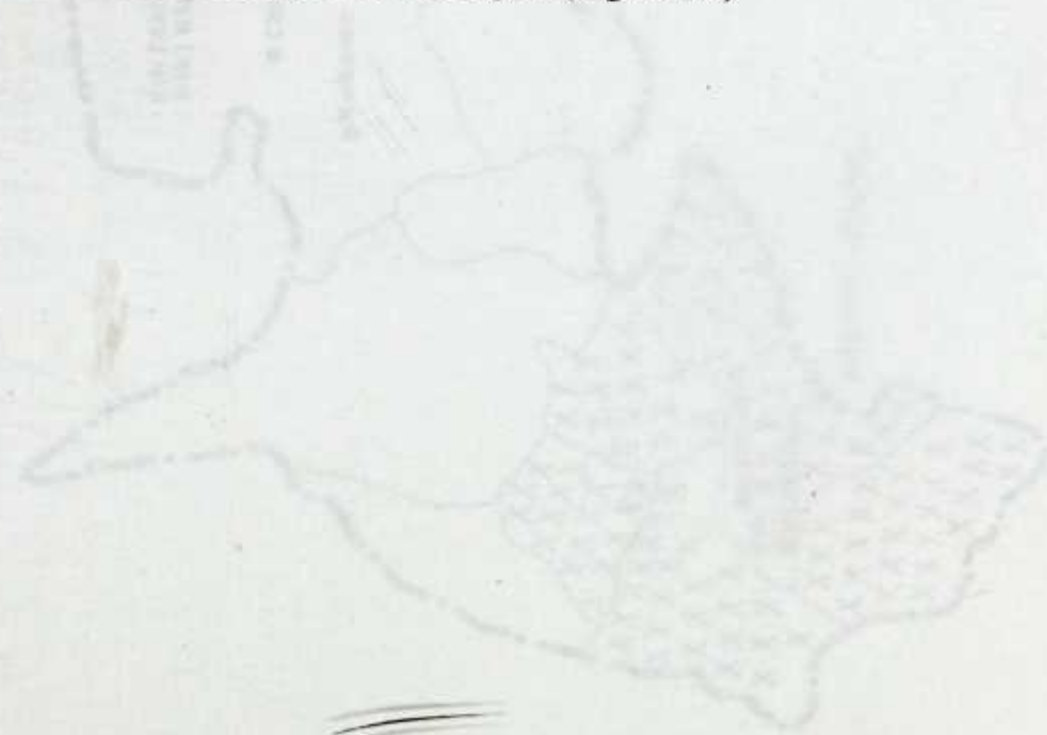
#### 1.8.1.2 Topography and climate:

The region's topography is characterised by a low elevation not exceeding 152 metres above sea level in the southern and eastern areas. The land rises to a height of 643 metres in other areas.

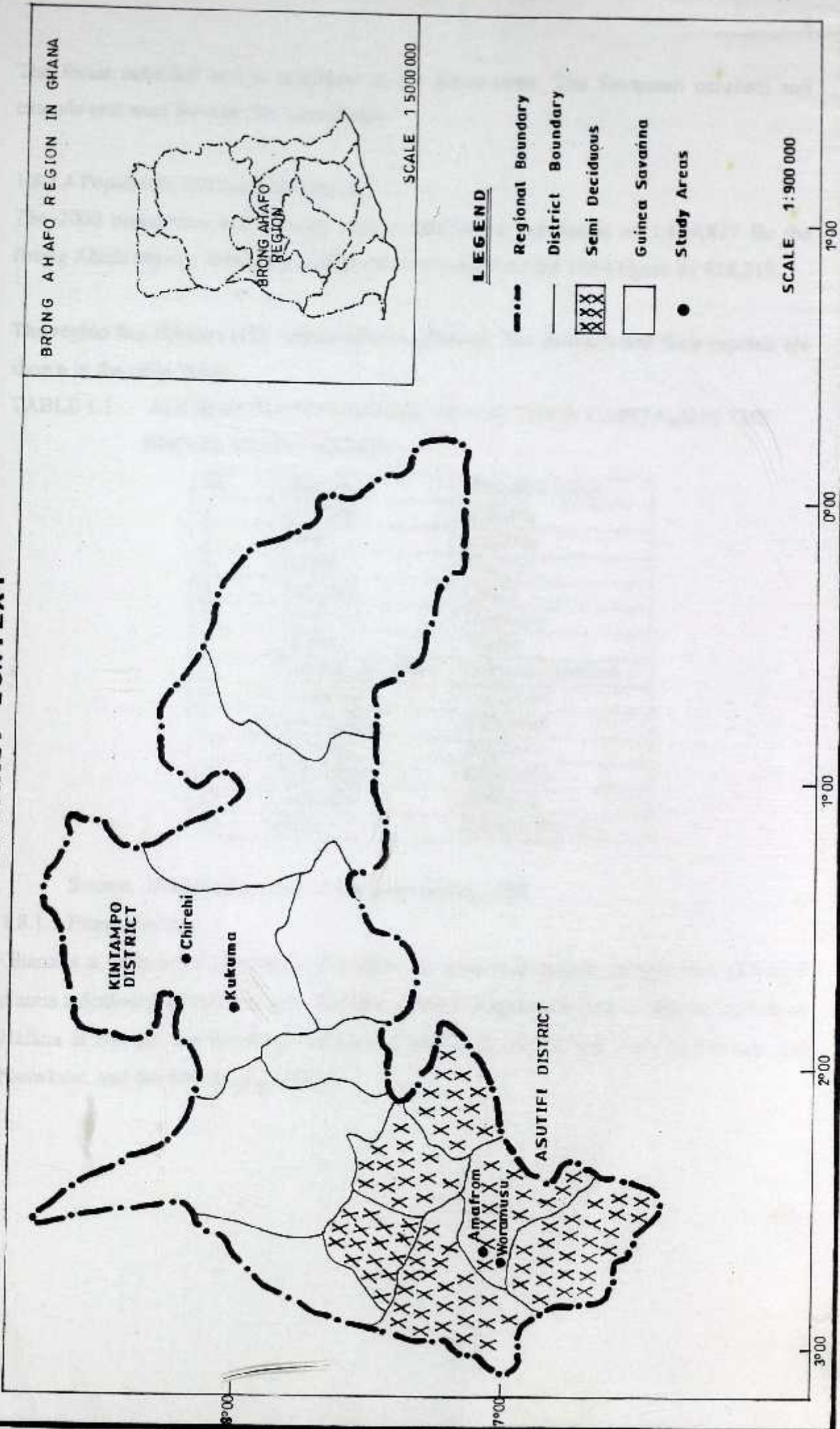
The climate of the region is in the transition zone between southern and northern Ghana. Temperatures are generally high, averaging 25-30<sup>0</sup>C throughout the year. Rainfall ranges from 1,500mm in the South to 1,000mm in the North. Rainfall has a double high period in the South and a single high period in the North, with May to October generally being the rainier season. Humidity is also high and averages 75 percent during the wetter months in the forest zone but lower during the drier season.

#### Vegetation and Soils

The region's vegetation is characterised by semi-deciduous forest of 8,680 kms<sup>2</sup> in the South and southwestern part covering the districts of Tano, Asunafo, Asutifi, Sunyani, Dormaa Ahenkro and Berekum. The Guinea Savannah woodland predominates the Eastern and Northern parts of the region (Figure 1.1)



**FIG 1.1. LOCATION OF STUDY AREAS IN THE NATIONAL, REGIONAL AND DISTRICT CONTEXT**



The forest ochrosol soil is dominant in the forest zone. The Savannah ochrosol soil extends east west through the central area.

#### 1.8.1.4 Population and Administration

The 2000 population and housing census recorded a population of 1,824,827 for the Brong Ahafo region, indicating a substantial increase over the 1984 figure by 618,219.

The region has thirteen (13) administrative districts. The districts and their capitals are shown in the table below.

TABLE 1.1. ADMINISTRATIVE DISTRICTS AND THEIR CAPITALS IN THE BRONG AHAFO REGION

No	District	District Capital
1	Sunyani	Sunyani
2	Tano	Bechem
3	Asutifi	Kenyasi
4	Asunafo	Goaso
5	Berekum	Berekum
6.	Jaman	Drobo
7	Dormaa-Ahenkro	Dormaa-Ahenkro
8	Techiman	Techiman
9	Nkoranza	Nkoranza
10	Wenchi	Wenchi
11	Kintampo	Kintampo
12	Atebubu	Atebubu
13	Sene	Kwame Danso

Source: Statistical service: Population census, 1984.

#### 1.8.1.5 Ethnic Groups

Ghana is a multi-ethnic society and peopled by various linguistic groups each of which claims a distinct history of origin. The Brong Ahafo Region consists of Akans, the Gur of Nafana at Sampa, the Konlongo of Seikwa and Badu, Hevla and Num of Namasa and Nsawkaw, and the Ntwumuru of Sene.

### 1.8.1.6 Regional Economy

Agriculture, mining, quarrying, manufacturing, construction and services are the main economic activities. Agriculture is the predominant activity. Employment statistics in 1984 indicated that 78.4 percent of the region's population was engaged in this sector.

### 1.8.1.7 Justification of Case Study Area

The Brong Ahafo region was selected as the case study, because it is located in the transitional zone. The region serves as buffer between the savannah and the forest zones. There is therefore the need to halt the fast approaching savannah in the region.

## 1.9 Methodology

### 1.9.1 Unit of Analysis

The study has three (3) units of analysis, viz.

- i. The bush fire policy (PNDC Law 229)
- ii. Community bush fire management; Fire volunteer squad, chiefs and elders, and community folks.
- iii. Government Institutions and Departments; Fire Service, Police services and District Assembly.

### 1.9.2 Measurement of Indicators

The following indicators were considered in the study;

- i. Trend of bush fire in Ghana
- ii. Degree of compatibility of the bush fire policy; internal consistency and with other national policies.
- iii. Preventive, control and monitoring options available in the policy.
- iv. Potency arrangement at various levels of Government.
- v. Communities awareness and involvement in the formulation of the policy.
- vi. Interrelationship between policy and practice.
- vii. Policy implementation problems.

### 1.9.3 Sample Procedure

The Brong Ahafo Region was first divided into two (2) data collection areas, corresponding to the two (2) ecological zones, namely high forest and savannah zones. (Fig 1.1). A total sample size was fixed arbitrarily at 100. This was considered the maximum, which could effectively be handled within the research budget and time (considering also problems in conducting interviews in predominantly illiterate rural farming communities). For a fair representation, a district each in the two ecological zones was randomly selected. Kintampo and Asutifi districts were thus selected. According to Paul et al (1988), the anthropomorphic impacts of natural resource base or its destruction can only be truly assessed at local scales- that is within small areas or on the scale of a village, town or local community. Therefore, two (2) communities were randomly selected in each district, since an intensive survey in only one village was also considered unsatisfactory because of its limited representatives (Nsiah-Gyabaa 1994). Settlements were picked for the random test based upon the following criteria.

- (i) Must have population size ranging between 400 and 1000 (using 1984 population census since that was ready at the time of the study)
- (ii) Have been affected by five or more bush fires within the study time.
- (iii) Must possess a high agricultural or conservation potential.
- (iv) Must be accessible by road.

The Settlements Selected were:

- |     |                    |                       |
|-----|--------------------|-----------------------|
| i.  | ASUTIFI DISTRICT:  | Woramusu and Amanfrom |
| ii. | KINTAMPO DISTRICT: | Kokuma and Chirahini  |

In order to avoid disillusionment commonly associated with mailed questionnaires or formal postal surveys (Mugenda, 1999), the direct interview method was used to collect information from respondents using a semi-structured questionnaire.

The number of households selected for interview in each village was based on the percentage of its 1884 population. This was done to ensure fair representation. Within each village a stratified random sampling technique was used to select households to be

interviewed. Purposive sampling technique was also employed to select technical respondents. The study thus involved the following categories of respondents.

- i. Laymen, farmers, craftsmen, housewives, traders and labourers
- ii. Traditional authorities, including chiefs and their elders.
- iii. Professional personnel from Fire Service and Police Service as well as retired civil servants
- iv. Opinion leaders such as Assembly members
- v. District Administrators

A number of informal discussions were also held to capture ideas and perceptions not available through the normal surveys (see Appendix II)

The breakdown of the total number of respondents in each settlement is shown in Table 1.2.

TABLE 1.2: RESPONDENTS SAMPLE FRAME ON INSTITUTIONAL SETTLEMENT AND DISTRICT BASIS

DISTRICT	SETTLEMENT INSTITUTIONAL	POPULATION (1984)	NO. INTERVIEWED				FIRE VOLUNTEER	TOTAL
			Police Station	Dist. Fire Station	Dist. Assembly	Community		
Asutifi	Institutions	-	2	1	1		4	
	Woramusu	463				20	29	
	Amanfrom	273				11	17	
Kintampo	Institutions		2	1	1		4	
	Kokuma	918				16	24	
	Chirahini	866				15	22	
Total			4	2	2	62	100	

Source: Author's Field Survey (March-April, 2002)

#### 1.9.4 Data Collection

The study relied to a large extent on primary data since there is not much data in published form. Besides, the use of primary data provided a better understanding of the factors at play in the communities and allowed a deeper analysis to be done. Data collected from various sources centred on;

- i. Peoples perception of bush fires
- ii. Bush fire policy, and
- iii. Potentials within the district for effective bush fire management

Published and unpublished sources also provided a base for secondary data retrieval. The sources were largely at the national level but these were of relevance to the study.

### 1.9.5 Data Analysis

The nature of the issues and processes under discussion necessitated the use of qualitative analysis for the data collected. However, simple quantitative methods such as percentiles, averages and the trend analysis were used. The study also employed the use of the simple regression technique and models in analysing data collected. The goal compatibility matrix, for instance, was used to assess the compatibility and consistency of the goals of the bush fire policy

#### 1.9.5.1 Defining the Model

##### 1.9.5.1.1 Capacity Variance Analysis (CVA)

The Capacity Variance Analysis is a model, usually in a matrix form, used for assessing institutional capacity for policy or project implementation. The major areas of capacity assessment are finance, equipment and human capacity. The model can be used to assess human capacity both in terms of quantity or quality (Abrampah, 2002 in Korkor and Kroes, 2002). The study however, employed the use of the quality assessment technique. This involved the assessment of fire volunteers expected knowledge, skills and ability. The two extremes were weighted to reflect the expected and actual scores. A variance scale was thus used to determine the decision criteria. This was achieved by finding the actual total scores, divided by the expected total score and expressed as a percentage.

##### 2.9.6.1.2 The Systematic Training Model (STM)

This is a qualitative framework adapted from Attwood Margaret's (1989) systematic approach to training. It is used in this study to examine the effectiveness of Fire Service training programmes for the Fire Volunteers. According to Attwood, training can

contribute to the effective use of organisation's resources only if it is approached systematically, based on the following stages:

Stage One: Formation of training policy that is supportive of organisational policy or corporate (development) plan.

Stage Two: Identification of training needs defined as the gap between the requirement of skills and knowledge inherent in the job and those actually possessed by the current job holder. Attwood, however, notes that it is misleading to analyse training needs only at the job level. Rather, a thorough analysis starts with an attempt to assess total organisational training needs in the context of management's plans for the future, current organisational structure as well as current expectations about the use of employees. Identifying training needs serve as the basis for development of any meaningful training plan.

Stage Three: The planning of training programme which involve the formulation of the overall objective of training, where and when should take place, content, methodology and who should be the trainer.

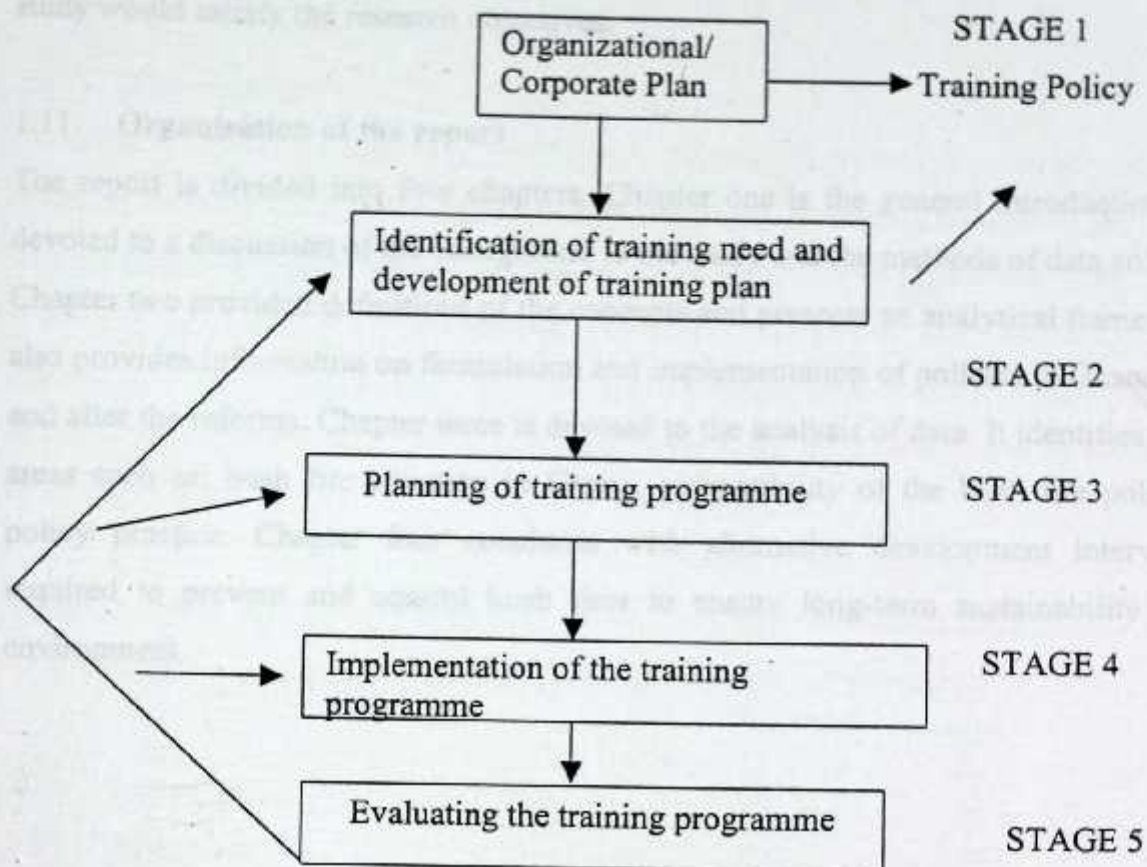
Stage Four: Implementing the Training Programme: This involves the selection of the size of the target group, mix of participants and conducting training in accordance with the objectives and design of training. Attwood observes that informing training encourages appropriate behaviour to be continued and in appropriate behaviour to be discarded.

Stage Five: Evaluating the training programme is essential in that it serves a feedback upon which the training process can be adjusted for better result in any future training programmes. According to Attwood a fair evaluation should not be based only on trainees' reaction or behaviour on the job but must also include the following:

- Manager's assessment of individual job performance.
- Organisational performance areas where training has been undertaken
- The degree to which the whole organisation has benefited from training.

The systematic approach to training is illustrated in Figure 1.2.

FIGURE 1.2: THE TRAINING PROCESS/SYSTEMATIC APPROACH TO TRAINING.



Source: Attwood Margaret (1989); Personnel Management; Longman, Macmillan Press London

#### 1.10. Limitation of the study

Having regard to the complexity of the microenvironment and the information required on various aspects of the regional ecology, the use of a single data collection method (household and institutional interview) is considered as a limitation to the study. The study was conducted at a time (March-April) when the Brong-Ahafo region was experiencing rains, a time when there were no bush fire prevention or control activities else the rural rapid appraisal technique would also have been employed in the study. Another limitation is the selection of 100 respondents to represent the whole of Brong-

Ahafo with a population of 1,824,827 (2000 Population Census Report). The danger with small samples is that they do not reproduce the salient characteristics of the accessible population to an acceptable degree (Mugenda, 1999; 42). In spite of these limitations, the study would satisfy the research objectives.

## 1.1 Introduction

### 1.1.1 Organisation of the report

The report is divided into four chapters. Chapter one is the general introduction. It is devoted to a discussion of the background to the study and the methods of data collection. Chapter two provided definitions of the concepts and presents an analytical framework. It also provides information on formulation and implementation of policies in Ghana before and after the reforms. Chapter three is devoted to the analysis of data. It identifies the key areas such as; bush fire situation in Ghana, compatibility of the bush fire policy and policy practice. Chapter four concludes with alternative development interventions required to prevent and control bush fires to ensure long-term sustainability by the environment.

## 1.2 Concepts

### 1.2.1 Bush Fire

They are fires in areas where forest resources, that is fires in cultivated areas. The difference between forest fire and bush fire are that while forest fires are fires in the reserved areas and usually classified as *haze* fires, bush fires are usually started by ground fire (Pyra, 1979).

### 1.2.1 Bush Fire Policy

It is a set of concrete guidelines in the form of legislation, rules and regulations that govern the use of bush land and the resources in them. It is concerned with the manner in which bush lands should be managed to serve the needs of people. In Ghana, the Bush Fire Prevention and Control Law, 1992 (PNDC Law 229) is the bush fire policy.

## CHAPTER TWO

### CONCEPTS AND OVERVIEW OF POLICY MAKING AND IMPLEMENTATION IN GHANA

#### 2.1 Introduction

Concepts hardly have universal definitions, because their meanings might change in different contexts Kessey (1995; 22). They can be said to be ideas or notions and can also be considered as tool of inquiry as well as the content or object of study itself. Inkoom (1999). This chapter therefore defines the Key Concepts as well as the conceptual framework. The issue of policy formulation and implementation is also considered in this chapter. Indicating **who** takes what decision **where** and for **whom** and with **whose** ideas to achieve what.

There is limited literature on bush fires, hence the study relied most on materials of forest fires. Nonetheless, the latter was found to be appropriate to the study.

#### 2.2 Concepts

##### 2.2.1 Bush Fires

They are fires in areas outside forest reserves, that is fires in cultivable areas. The difference between forest fires and bush fires are that whilst forest fires are fires in the reserved areas and mainly classified as crown fires, bush fires are mainly surface or ground fires (Pyne, 1919).

##### 2.1.1 Bush Fire Policy

It is a set of concrete guidelines in the form of legislation, rules and regulations that govern the use of bush lands and the resources in them. It is concerned with the manner in which bush lands should be managed to serve the needs of people. In Ghana, the Bush fire Prevention and Control Law, 1990 (PNDC Law 229) is the bush fire policy.

### 2.1.1.1 The importance of a bush fire policy

Why is it important to define and establish a bush fire policy? Is it worth the effort?

Inkoom (1999) assigned two basic reasons;

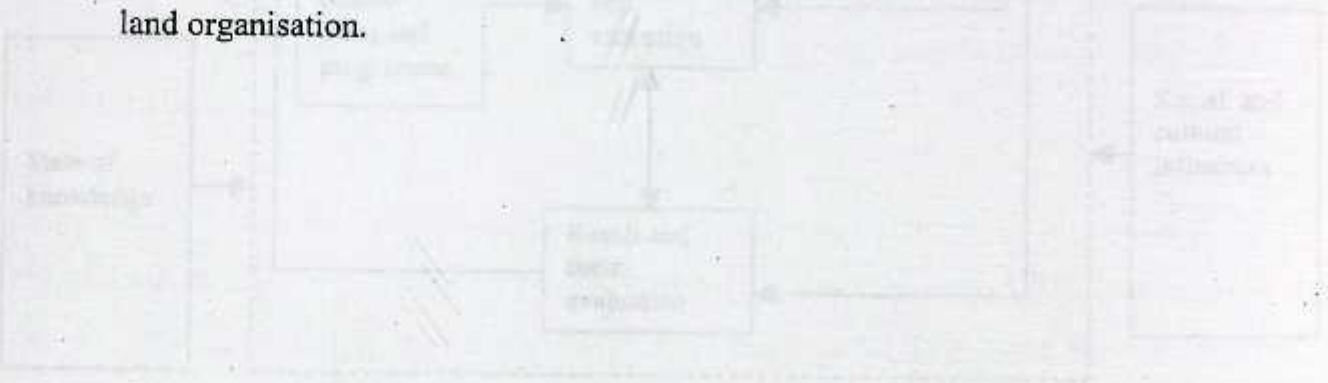
- i. That preferences of the individual bush land users do not always coincide, giving rise to conflicts among interest groups. Policies, when appropriately formulated and implemented can help resolve some of these conflicts.
- ii. That bush fire policy must take care of externalities of bush land production: effects on soil, water resources, landscape and recreation need.

### 2.2.2.2 Conceptual Framework: Bush Fire Policy as an Integral System of Elements.

An understanding of policy as a system is useful both in formulating a new policy or in evaluating and revising an existing one. Husch (1987). The study however, adapted Husch's framework – "Forest Policy as a System" as a tool of inquiry.

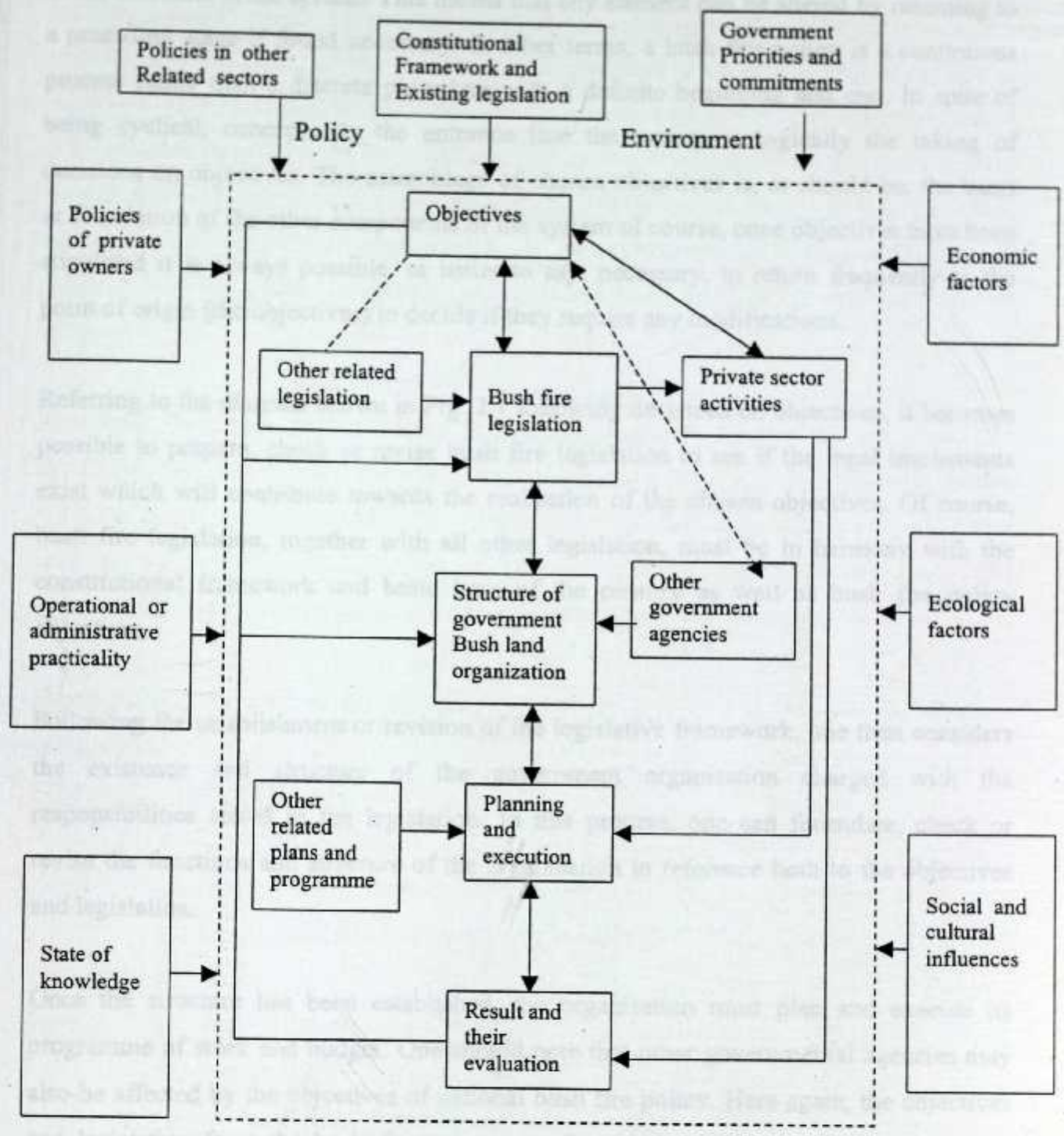
A country's bush fire policy is best understood as a system of interrelated elements which consists of;

- i. The statement of objectives
- iii. A body of legislation
- iv. The structure and administration of a governmental bush fire organisation.
- v. The planning, budgetary and execution of programmes of the governmental bush land organisation.



Source: Adapted from FAO Forestry Paper No. 81: Guidelines for forest policy formulation (FAO 1987, 3) by Husch-Baethan

FIGURE 2.1 BUSH FIRE POLICY AS A SYSTEM



Source : Adopted from: FAO/Forestry Paper No. 81; Guidelines for forest policy formulation (FAO 1987; 3) by Husch Bertham.

These elements form a logical and coherent chain. Actually, these elements constitute a cyclical system as shown in Fig. 2.1. There is a two-way movement between each and all of the elements in the system. This means that any element can be altered by returning to a preceding stage if found necessary. In other terms, a bush fire policy is a continuous process rather than a discrete procedure with a definite beginning and end. In spite of being cyclical, conceptually the entrance into the system is logically the taking of decisions on objectives. The assemblage of chosen objectives is, or should be, the basis or foundation of the other components of the system of course, once objectives have been stipulated it is always possible, or better to say, necessary, to return frequently to the point of origin (the objectives) to decide if they require any modifications.

Referring to the diagram shown in Fig. 2.1 following decisions on objectives, it becomes possible to prepare, check or revise bush fire legislation to see if the legal implements exist which will contribute towards the realisation of the chosen objectives. Of course, bush fire legislation, together with all other legislation, must be in harmony with the constitutional framework and basic laws of the country as well as bush fire policy objectives.

Following the establishment or revision of the legislative framework, one then considers the existence and structure of the government organisation charged with the responsibilities stated in the legislation. In this process, one can formulate, check or revise the functions and structure of the organisation in reference both to the objectives and legislation.

Once the structure has been established, the organisation must plan and execute its programme of work and budget. One should note that other governmental agencies may also be affected by the objectives of national bush fire policy. Here again, the objectives and legislation form the basis for programme formulation. The elements of structure, planning and execution taken together form the administrative portion of the system.

As shown in Fig. 2.1, the activities of the private sector are strongly influenced, and in some aspects, restricted or controlled by policy objectives, legislation and programmes of the governmental agency responsible for bush land management. At the same time, the interests and activities of the private sector can have a reciprocal influence on the objectives of a government bush fire policy and on legislation. The compliance and observance of the objectives, laws and controls by the private sector must be evaluated in combination with the results of the governmental bush land agency's programme. This evaluation will then have an influence on the objectives, legislation structure and programme of the governmental organisation, completing the feedback or cyclical pattern of the system.

According to Husch (1987), everything within the box consists of the main and subsidiary elements forming the policy system. Outside the dotted box are those factors which taken together form the environment in which the policy actors or participants take, or try to influence decisions and actions regarding objectives, legislation, the governmental bush land management agencies, institutions and their operations.

Husch (1987), categorized the influences or criteria loosely into two groups, technical and political.

**Technical:** (a) Ecological factors

(b) Economic factors

(c) State of knowledge

(d) Operational or administrative practicability

**Political** (e) Policies in other related sectors

(f) Legislation

(g) Governmental priorities and commitments

(h) Social and cultural influences

(i) Policies of private owners.

The technical criteria are those which are based upon quantifiable or verifiable analyses, while the political influences are of a more subjective nature being dependent to a greater extent upon opinions, beliefs and value judgements.

### 2.2.3 Community Participation.

Annex III of Document E/2931 of the United Nations Economic and Social Council (Training Manual for local level planning; 1989, pg. 22) defines community participation as : the process by which the efforts of the people themselves are united with those of governmental authorities in order to improve the economic, social and cultural conditions of communities, to integrate these communities into the life of the nation and enable them to contribute fully to national progress" In the Ghanaian context, governmental authority at the District level is the District assembly. The communities would simply refer to all those living in a village, zone or district. At times community participation is synonymous with "citizen participation" "public participation", "community involvement" "target group involvement", to mention but a few (Tamakloe 1996). Gyamfi (1996) identified three main types of community participation or involvement. These are (a) Nominal or Passive participation (b) Consultative participation, and (c) Power sharing.

**Nominal or Passive Participation:** This amounts to no more than a uni-directional flow of information from the top (central government) to the bottom (Local communities)

**Consultative Participation:** In this type of participation, the community is not only informed but reacts and expresses opinion. In other words, the community and government agencies have an equal share in decision-making. This is the form of community participation envisaged in Ghana and will be the focus of this study.

**Power Sharing:** This is simply the sharing of power; that is, a legal measure or regulation which enables the community to insist on its point of view to be taken into consideration.

The potency of community participation in the effective management of development projects, cannot be overemphasised. The success, or otherwise, of a project at the local level should, as a matter of necessity, involve the people whose welfare the project is

expected to improve (Gyamfi 1996). However, whilst so much has been added to the concept in theory so little has been done to demonstrate the concept in practice (Tamakloe 1996). The latter enumerated a number of problems and limitations which inhibit community participation in the planning process at the district level, among which are;

- (i) There is lack of information flow between community, the planner and the policy-makers, because there is a wide time and space gap between target groups and district administrative centres due to poor surface accessibility.
- (ii) Effective means of involving the community in decision-making, for example, public tend to be expensive in terms of time, human resource and transportation cost.
- (iii) There is a general negative or elitist attitude on the part of professionals in line agencies to interact with the community in open fora.

### **2.3 Policy Making in Ghana Before the Reforms**

Administrative reforms in Ghana have been pursued since pre-independence days, with diverse immediate objectives, but often with a similar broad goal – that is, the delegation of decision-making authority to a particular group or limited groups of people in the performance of public services. This goal may itself generally be taken to correspond to decentralisation. This goal has in the past not led to a sharing of decision-making authority between the central government and other levels of government and the public services. Aryeetey (1985). This section will therefore consider the planning machinery from the period 1919 to 1988 (when the current local government system came to being).

#### **2.3.1 Pre-Independence: The One-Man Plan Period.**

It is often said that colonial governments were too concerned with the exploitation of raw materials for the metropolitan industry to have had time for social and economic development in the colonies. While this may generally be true, an exception may be found in the government of Sir Gordon Guggisberg. Guggisberg has been quoted as saying his goal was to build a model colony and “translate a scheme of vision..... directly essential to the progress of the people” Kay (1972).

Guggisberg, an engineer and surveyor by profession, with an unusually long experience in West Africa was the policy and technical expert who prepared the plan, determined its priorities and proposals, financing, as well as schedule of implementation. Aryeetey (1985).

According to Aryeetey, (1985) the Guggisberg Ten-Year Development Plan was mainly implemented through departmental projects by way of annual budgets.

One could conclude that Guggisberg's plan started the practice of sectoral department being solely responsible for plan implementation and also being responsible only to the central government; but a criticism of the practice at the time would be inappropriate since there was no alternative institutional framework to take the various aspects of planning.

### 2.3.2 Project-by-Project Approach to Planning 1951-61

After an abortive plan of 1946-56, the colonial government launched another Ten-year plan for 1951-61. This was later taken over by the national government which turned it into a 5-year plan 1951-56 – the change was only in the implementation period. The official objective of the plan was to advance economic services and production.

To draw the original Ten-year Plan for Economic and Social Development of the Gold Coast 1951-61, the Governor's office instructed all departments to prepare individual departmental programmes for the plan period. These sectoral programmes were accordingly prepared by headquarters staff of the appropriate departments. This procedure may be regarded as a major departure from Guggisberg's approach, in the sense that it was more decentralised but heavily sectoral. Just as in the previous plan, implementation was done largely by sectoral department. By this time local council were being formed and were given responsibility for supervising some aspects of projects in their localities.

### 2.3.3 Centralized Planning 1957-1966

Centralized planning as used here refers to the period in Ghana's history when central planning machinery was first set up by central government to take care of plan preparation, formulation and co-ordination of implementation.

In the period 1957-1966, two development plans were prepared but only the second is considered here, since the first was only an interim plan, while the government prepared itself for the second which was to be a comprehensive plan.

The seven-Year Development Plan 1963/64 – 1969/70 was labelled the "Plan for National Reconstruction and Development". To prepare the plan, the Development Commission and the Standing Development Committee were both dissolved, and in their place came the state planning commission. It was actually the first real central planning machinery for Ghana, placed directly in the office of the president and headed by the President himself.

There is obviously no doubt about the centralized nature of the plan formulation. It has been said that even government ministers not included in the commission, had difficult access to the commission. The President believed that planning was basically the business of experts and technocrats, and as such, kept the plan as far away as possible from politics, Mensah (1972)

The main implementing agencies were the various public departments, boards and corporations under the various ministries.

### 2.3.4 The Planning Machinery in the Busia Period 1969-72

In 1969, the military government of the National Liberation Council (NLC) handed over power to the democratically elected government of Dr. Busia and his Progress Party. Following the trend set by the two post-independence governments, the government of Dr. Busia also set up an economic planning machinery to perform functions similar to

those performed by the National Planning Commission and the NLC Economic Committee. This body was called the Cabinet Standing Committee on Development.

What the composition of this committee indicates is the fact that the Head of State or Government has always been the head of the planning machinery in Ghana, further emphasising the centralized nature of it. However, the government was overthrown soon afterwards and never had the chance to implement it.

### 3.3.5 The Planning Machinery since the National Redemption Council/Supreme Military Council (NRC/SMC) to 1982.

The need to plan development through specific central institutions was given a further boost under the second military regime in 1974. The National Redemption Council established the National Economic Planning Council (NEPC) and charged it with the task of preparing a Five-Year Development Plan. Following the earlier trend, it was under the chairmanship of the Head of State and had 35 members, picked up from the civil service, trade unions, universities, business, chiefs, co-operative movements and other related organisations. The composition of the council reflected the government's conception of decentralization, a broader-composed machinery, nevertheless the Accra-based. Another major distinction between the NEPC and the others before it was that its role was advisory and it did not have the decision-making powers that the others had.

For the Five-Year Plan, two distinct bodies were charged with plan formulation. In addition to the NEPC, the Ministry of Economic Planning was separated from the Ministry of Finance and Economic Planning and given a specific role in the development of plans, as the technical agency for the NEPC. It is clear from this division that while the NEPC advised on plan formulation, the Ministry did the actual formulation.

The Five-Year Plan indeed made proposals for the implementation of the plan to reflect what the formulators saw as decentralization. Apart from the traditional use of public departments and ministries as the implementing agencies, other promotional bodies – such as Bank for Housing and Construction, the Merchant and Finance Bank and Co-operative Bank – were given a role.

With the transfer of political power to a democratically elected government in 1979, the NEPC was dissolved with the intention to reconstitute it. This was never done. In actual fact with the exception of the demise of the NEPC, the structure of the planning machinery remained as it had been since 1974, functioning through the Ministry of Finance and Economic Planning and the other sectoral ministries.

It is evidenced from above that Ghana has been pursuing national development plans formulated by a central planning agency, and implemented by sectoral departments of the central government, since independence. The formulating agencies are very much centralised institutions constituting technocrats and politicians in the national capital.

But what is wrong with development planing from above? Some arguments raised by Kunzmann (1996) are that:

- (i) The local problems and constraints are best known in the region, and the local people as well as the professionals living in the region do know the local resources and potentials much better than national personal commitment and networks.
- (ii) Planners at the national/central level are too much influenced by national political regards and considerations. The regional interest is always ranked second.
- (iii) Activities of administrators and decision-makers can be much better monitored and controlled by the people living in a region.

## **2.4 Policy Making and Implementation under the Current Decentralization in Ghana**

### **2.4.1 Background to the Decentralization Programme.**

The need to decentralize and deconcentrate central government functions and activities has been expressed in academic literature for some time now (example Aryeetey, 1986), Rondinelli, 1983). The idea has been increasingly accepted by politicians and central governments. In Ghana, several attempts were made by successful governments to decentralise political authority through the local government system. However, such efforts were never either allowed "to see the light of day" or at best, they were accorded

half-hearted attention. According to Kokor (2002) reasons responsible for this state of affairs includes; lack of courage and political commitment by the governments to implement recommendations, bureaucratic obstruction for fear of losing or parting with power and accompanying rights and privileges – the patronage system – to the districts, lack of logistics and qualified staff.

The new attempt at decentralisation and local government reforms started with a "May 1982 Declaration". The two-point Declaration states as follows (Zanu 1986:3 in Kokor 2001)

- (i) To convert national level ministerial structures into planning, monitoring and evaluation organisation capable of co-ordinating sectoral policies, programming and budgets.
- (ii) To transfer implementation responsibilities and activities together with appropriate financial resources, staff and authority to regional district and sub-district organisations and such staff transferred should belong to and be paid directly by the local level institutions so as to eliminate dual allegiance and give meaning to decentralisation.

On the basis of the above, the stated objectives of the decentralised system were four-fold namely (Kokor 2001:105);

- (i) To democratise state power in a manner that would create opportunity for a majority of Ghanaians to take part in the collective decision-making and have access to political authority;
- (ii) To reorganise the machinery of government and reform the local governments to take responsibility for local administration and development and to make public administration more efficient and responsive to local needs;
- (iii) To restructure allocation of resources and re-assign functions and responsibilities to those levels of governments namely national, regional and district, to promote efficiency of management, and
- (iv) To promote local development with the active involvement of the people, as a special preoccupation to improve living conditions in the country.

#### 2.4.2 Legislative Instrument of Policy Formulation and Implementation under the Decentralisation System.

The major legislative instruments which have a direct reflection on the policy formulation and implementation process were the national constitution (1992), the Local Government Act, 1993 (Act 462); the Civil Service Law, 1993, (PNDC law 327); the National Development Planning Commission Act, 1994 (Act 479); The National Development Planning (systems) Act 1944 (Act 480) and the numerous legislative instruments that were passed to establish a number of the sectoral departments or line agencies.

#### 3.4.3 Policy Formulation and Implementation Process under the New Decentralisation

The expected functional process for policy formulation and implementation as outlined by the Local Government and National Planning Acts (Acts 462 and 480), is presented in Appendix 3.

Theoretically, there are four distinct channels of vertical interaction.

- (i) The mainstream political channel from the community at the bottom through to the Unit and Area Council stages to the District Assembly (DA) and its sub-committees. It goes up to the regional level through the Regional co-ordination Council (RCC) and finally the Cabinet.
- (ii) Another political channel which is more legislative and extremely political. This is also from the community at the base and straight to parliament through their elected representatives. This might also involve organised political groups such as the trade unions and political parties.
- (iii) The third channel is the technical flow which is for planning purposes. This again is perceptively from community through the District Planning and Co-ordinating Unit (DPCU), The Regional Planning and Co-ordinating Units (RPCU) to National Development Planning Commission (NDPC) and to the cabinet or the President.
- (iv) The fourth channel is also a technical flow but for supervisory and consultative purpose. It also flows from the national sectoral ministries through the regional sectoral departments, and the District Sectoral Agencies (DSA) to the communities. Quite significant, is the link between Non-governmental Agencies (NGOs) and the District

Assemblies and also with the District Sectoral Agencies (DSA). This is considered to be a consultative or a collaborative channel since the NGOs may not directly be under the control of the District Assembly but their objectives must be synchronised with that of the district. (Kroes/Mensah Abrampa, 1996) noted that all the four identified vertical interactions, theoretically, emphasize a two-way interaction for effective participation, support, and unity of direction and purpose in the goal formulation and implementation process.

The horizontal (lateral) interaction is also facilitated by the channels within the three respective levels of policy formulation and implementation process in the district assembly. The Regional Co-ordinating Council (RCC) is for co-ordinating purposes while the President (cabinet) only initiates and approves the framework. The technical action at each level is expected to be undertaken by the planning and administrative groups. The output however, should not be a conceived technical document but the exposed aspirations of the "rulers and the rules" which are developed into a national framework for the approval of the Cabinet and ultimately parliament. It should necessarily go through a public debate for review and also solicit support. The aim is to implement for definite results and outcomes.

Implementation strategies are to be developed by District Assemblies focussing, in fact, on the realities at the district level and the capability of the district administration, which is the major implementing organ of district goals. The national goals, in reality, are expected to be nothing but within the national framework, an expression of the collective and synchronized district goals reflecting the local context and realities regarding existing opportunities and constraints.

#### 2.4.3 Actors in Policy Formulation and Implementation Process under the New Decentralisation.

It is evidenced from the above that in the formulation and implementation of goals, there are three major actors namely, the politicians, the technocrats (administrators and planners) and the public, as presented in Appendix IV.

With the information gathered from the public, which represent their needs and aspirations, by the politicians and technocrats, thematic statements or goals are formulated. The goals having been approved by the politicians are then communicated to the public for their feedback. A positive acceptance by the public is an indication of their support and thus the goals are converted into definite strategies for implementation. The implementation process is monitored by the technocrats and the necessary feedback given to the politicians for review and redirection when necessary.

#### 2.4.5 Evaluative Conclusion on Policy Formulation and Implementation under the current Decentralisation.

The essence of the District Assembly and the inherent purpose of policy formulation and implementation process is to pursue a development process that would meet the aspirations of the people in the district. Clearly, therefore, as the first function of the District Assembly requires, "ensures that the plans are prepared with full participation of the local community" it was expected to live up to this requirement.

The experiences of Bacho (in Kokor and Kroes 2001) in the Builsa District Assembly show that a participatory bottom-up process is really possible and can, indeed achieve laudable objectives such as ensuring democratic decision-making processes and accountability.

The continuing challenge of the decentralisation is that, the action to establish an effective goal formulation process and for that matter the achievement of an appreciable level of practical decentralisation, should not be limited to the shifting and amendment of legal instruments nor the arbitrary creation of new bodies and institutions but a better understanding of the whole decentralisation process, an appreciation of national and district goals and actions on the part of the actors, and the location of the right and confident personnel at development monitoring centres in the administrative set up. (Kroes/ Mensah-Abrampa 1996).

## CHAPTER THREE

### DATA ANALYSIS

#### 3.1 Introduction

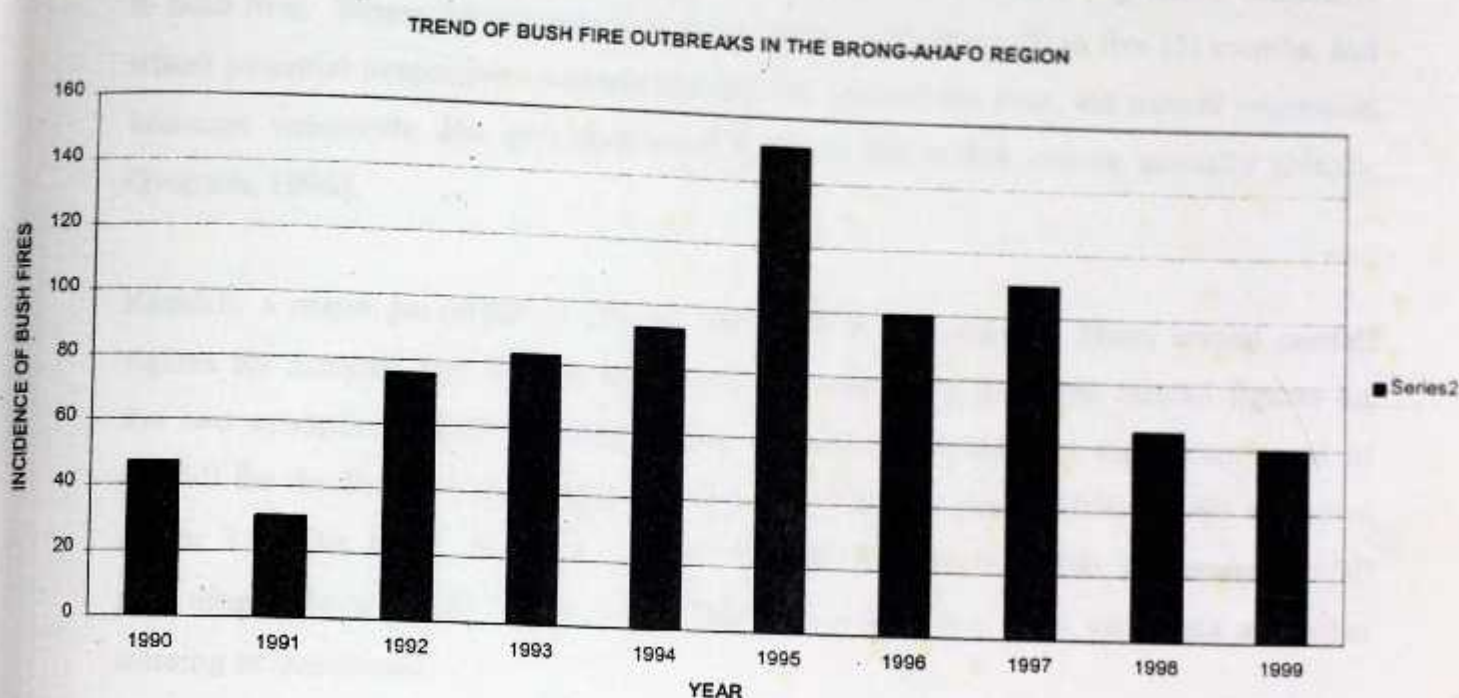
Data obtained from the field in raw form is difficult to interpret. Such data must be captured, coded, keypunched into a computer and analysed. It is from the result of such analysis that researchers are able to make sense of the data (Mugenda, 1999) In this chapter, data collected from the field is systematically analysed so as to obtain detailed information about the phenomenon being studied in order to come to some useful conclusion and recommendations. Specifically, the chapter will consider among others the following indicators; trend of bush fires, compatibility of the bush fire policy (both internal and external), preventive, control and monitoring options available in the policy. The discussions are, however, limited to the concepts explained under chapter two.

#### 3.2 Trend of bush fires

The issue of bush fire is one of the challenging "man versus environment" conflicts in Ghana. Ghana experienced serious bush fires during the catastrophic sahelian drought (1973-74) and again in the period 1984-85. In recognition of the detrimental impacts of the bush fires, legislative controls were introduced in 1983. They were later repealed by the Bush Fire Prevention and Control Law (PNDC Law 229) in 1990. The study therefore deemed it necessary to examine the objectives of the policy – prohibition of bush fires – by using the trend analysis. By making reference to the conceptual framework (2.2.2.2.) this is the entrance to the evaluation exercise.

The bush fire situation in the Brong-Ahafo region is shown in figure 3.1

FIGURE 3.1



Source: Author's Construct; Data from Ghana National Fire Service, Regional Headquarters, Sunyani (1990 – 1999)

Although there were marked year – to-year fluctuations the underlying trend of the incidence of bush fires has been generally upward. Thus, using 1990 and 1999 as the basis for this submission, 1999 recorded an increase of 28 percent of the 1990 bush fire outbreak. There was a fall of bush fire outbreaks from 47 in 1990 to 31 in 1991. After which, the region started experiencing steeply upward trends, reaching its peak in 1995. 151 outbreaks were recorded in 1995. The region again experienced steeply downward trends after 1995, and in 1999, 60 bush fire outbreaks were recorded.

### 3.2.1 Causes of bush fires

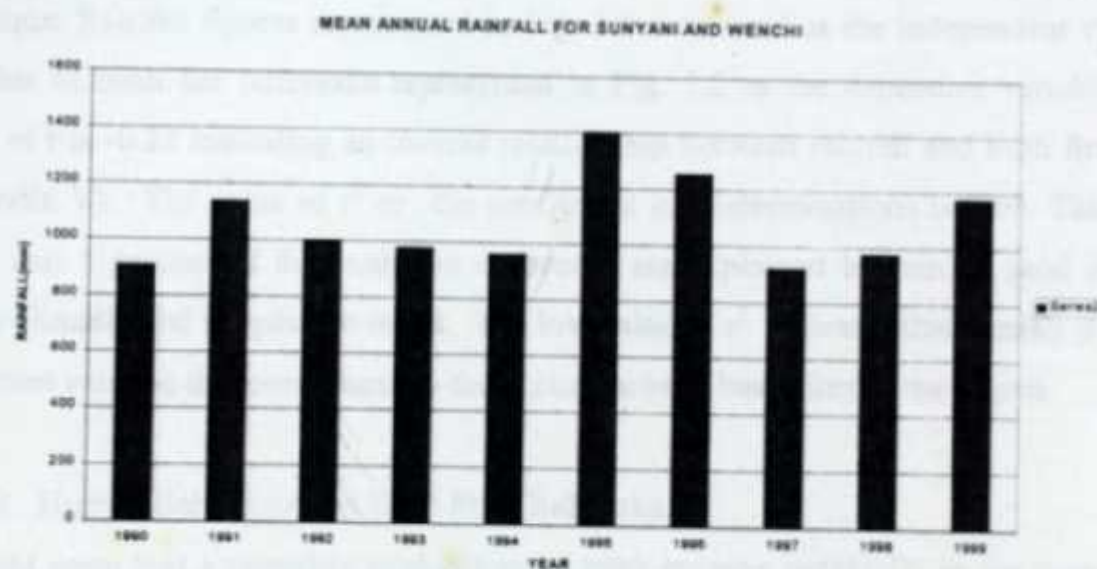
Many experts (Nsiah-Gyabaah (1996); Hare (1984); Rowntree et al (1985); Ampadu-Agyei (1986); Gboloo (1999) have thought of climatic factors and human behaviour as the two major factors responsible for the trend of bush fires.

### 3.2.1.1 Climatic Factors and Bush Fire Outbreaks.

Climatic factors, especially rainfall, and wind speed play an important role in bush burning. Weather extremes and rainfall variability make the natural vegetation vulnerable to bush fires. Where the wet season is short, lasting only three (3) to five (5) months, and where potential evaporation exceeds rainfall for most of the year, the natural vegetation becomes vulnerable and gets destroyed by bush fire which occurs annually (Nsiah-Gyabaah, 1996).

Rainfall, a major parameter of climate was used in the analysis. Mean annual rainfall figures for Sunyani and Wenchi were used. By combining available rainfall figures for the two synoptic climatic stations, it was possible to establish a significant trend of rainfall for the Brong-Ahafo Region for the period for the period 1990 – 1999 as shown figure 3.2. The study, however, ignored rainfall figures from the numerous rainfall recording stations in the region for simple reason that data from such data are either missing or inaccurate.

FIGURE 3.2



Source: Author's Construct: Data from Meteorological Service Department, Regional Headquarters, Sunyani (1990 – 1999)

Figure 3.2. depicts a downward trend of rainfall in the Brong-Ahafo Region on a time scale of 4 years between 1991 to 1994. After which, the region recorded a sharp rise of 1401.6 mm in 1995. Mean annual rainfall for the region started falling again and a record of 1178.2 mm was made in 1999.

According to Church (1974) about 100 mm of rainfall per month is often regarded as the minimum for agricultural needs or sufficient for most plant growth, and where rainfall is fairly well distributed throughout the year, about 1,270 mm annual rainfall seem to be ideal (Church 1974 in Nsiah Gyabaa 1996). It is therefore clear from Figure 3.2 that apart from 1995 where rainfall was slightly higher than 1270 mm, the region has experienced droughts of varying duration. Years of low rainfall have been recurrent in the last decade. Average rainfall has generally fallen below what considers ideal for plant growth, a condition where potential evaporation exceeds rainfall thus making the natural vegetation vulnerable to bush fire.

Based upon the experts' claim and the analysis so far made, the study went a step further by examining how climate and bush fires are related by using the simple regression technique. Rainfall figures represented in Fig. 3.2 were used as the independent variable and that of bush fire outbreaks represented in Fig. 3.2 as the dependent variable. The value of  $r$  is -0.23 indicating an inverse relationship between rainfall and bush fires (see Appendix V). The value of  $r^2$  or the coefficient of determinations is 0.05. This also states that 5 percent of the bush fire outbreaks are explained by rainfall (and for that matter climate) and 95 percent is not. The low value of  $r^2$  indicates that rainfall is not an important variable that contributes to the occurrences of bush fires in the region.

#### 3.2.1.2 Human Behaviour and Bush Fire Outbreaks.

It would seem that a complete prohibition of bush burning especially in the rural areas, would be impossible to achieve, for the culture of burning is entrenched in the people's way of life. Bush burning has a long pedigree and it is deeply rooted in the socio-economic life of Ghanaians. Table 3.1 is a summary of respondents' answers on some of the causes of bush fires. All the respondents from the two districts identified group

hunting and the use of fire as a tool of preparing the land for farming as major causes of bush fires. However, the ecological difference between the two districts also accounted for some differences in their reasons for burning. While in the Kintampo district 86 percent of the respondents saw burning of pastures as a major cause of bush fires, none of the 50 respondents in the Asutifi district made mention of it. On the other hand all the 50 respondents in the Asutifi district as against 5 respondents in the Kintampo district saw palm wine tapping as a major cause of bush fires in the region. The issue of cooking on the farm was also given more consideration in the Asutifi district than in the Kintampo district. After all what has the farmer in the Savannah got to do in the farm during the dry season to warrant cooking on the farm.

TABLE 3.1 MAJOR CAUSES OF BUSH FIRES IN THE BRONG-AHAFO REGION

ACTIVITY	KINTAMPO		ASUTIFI	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Group hunting	50	100	50	100
Pasture burning	43	86	-	-
Honey extracting	35	70	37	74
Land clearing	50	100	50	100
Careless throwing of cigarette butts	32	64	20	40
Cooking on the farm	13	30	33	66
Palm wine tapping	5	10	50	100
Akpeteshie distilling	1	2	25	50

Source: Author's Construct (June, 2002).

The study revealed that there used to be a number of age-old institutions governing the use of fire. These institutions or sanctions served as checks and balances to regulate the excesses in the use of fire. For example in the past, the farmer could not burn his farm unless he has prepared a fuel break or fire belt around the slashed area. In other areas too it was sacrilegious for a person to carry a naked fire across the village into the bush. This

Criteria	Score
Very compatible	2
Compatible	1
Neutral	0
Not supportive	-1
Conflicting	-2

**Very Compatible** was used for the situation where the establishment of a particular element was necessary for the attainment of the other, and without one the other could not be attained. **Compatible** was also used for the case where the two goals compared would facilitate the attainment of each other, although without the other there could still be a level of attainment. **Not supportive** referred to cases where the establishment of one element may reduce the likely implementation success of the other. **Conflicting** was used for exceptional situations where the implementation of one element may prevent the total attainment of the other element. This implies that it may be very difficult to pursue the two simultaneously.

#### Policy Elements

- P1 Prohibition of bush fires
- P2 Prescribed burning within conservation area
- P3 Prescribed burning outside conservation area for agricultural purposes
- P4 Establishment of bush fire control sub committee
- P5 Establishment of town area or Unit Fire Volunteer Squad
- P6 Prevention of fire originating from road side
- P7 Training of Fire Volunteer Squads
- P8 Penalties for persons found guilty of violating the provisions of the policy
- P9 Duty to report bush fires.

Table 3.2: GOAL COMPATIBILITY MATRIX (ELEMENTS OF BUSH FIRE POLICY)

Elements of bush fire policy	P1	P2	P3	P4	P5	P6	P7	P8	P9	Total
P1	-	1	1	2	2	1	1	1	1	10
P2	1	-	0	2	2	0	1	1	0	7
P3	1	0	-	2	2	0	1	1	0	7
P4	2	2	2	-	2	2	2	2	2	16
P5	2	2	2	2	-	2	2	2	2	16
P6	1	0	0	2	2	-	1	1	1	8
P7	1	1	1	2	2	1	-	1	1	10
P8	1	1	0	2	2	1	1	-	1	9
P9	1	0	0	2	2	1	1	1	-	8
Total	10	7	7	16	16	8	10	9	8	

Source: Author's construct (June, 2002). Information from the PNDC Law 229.

Based on the criteria above, the compatibility of each element of the policy was established. The output of the analysis is shown by Table 3.3. The maximum expected score - if an element is very compatible throughout - is sixteen (16). The closer the total score of an element to the expected total, the more compatible or supportive it was. "Establishment of bush fire control sub-committee" and "Establishment of town, area and unit Fire Volunteer Squads" stood out as the most compatible elements with a total score of 16 for each element. It is evident from Table 3.3 that all the elements could be implemented without any visible conflicts, since they all had positive scores.

The establishment and training of Fire Volunteer Squads and establishment of bush fire control sub-committee could assist greatly in the prohibition of bush fires through educational programmes and effective fire fighting operations. The two elements could as well enforce the institutions of penalties for bush fire offenders. The study observed that the Fire Volunteers are the front line agents in fire prevention and control.

On the whole, the matrix recorded no conflicting or non-supportive elements. The general compatibility results were encouraging.

### 3.3.1.2 External Consistency

Apart from ascertaining the internal compatibility, the study also saw the need to assess the external consistency of the policy, especially between the bush fire policy and the Ghana National Fire Service Act, 1997 (Act 537). This was vital in ensuring supportive development activities and developing conflict resolution strategies.

In the bush fire policy, organisation of Fire Volunteer Squads is done by the Bush Fire Control Sub-committee of the Executive Committee of the District Assembly (Section 6 (1) (d)), while GNFS is assigned with the sole responsibility of training the Fire Volunteer Squads. (section 6). However, in the GNFS Act, the service in addition to its training responsibility is also assigned the duty of organising the Fire Volunteer Squads (Section 4 (e)). These are totally two (2) non supportive sections. Now, who is to organise the Fire Volunteer Squads? Is it the Bush Fire Control Sub-committee or Ghana National Fire Services (GNFS)? This is a question, which needs to be addressed sine the two institutions do not work as a team

### 3.3.2 Review of Prevention, Control and Monitoring Options Available in the Policy.

In identifying and reviewing what options are available as elements of national bush fire policy, the study deemed it possible to scrutinise the options against the basic concepts of bush fire management cycle as shown in Appendix VI

Table 3.3 depicts a summary of the reviews of prevention, control and monitoring options available in the bush fire policy.

TABLE 3.3:  
SUMMARY OF REVIEW OF PREVENTION, CONTROL AND MONITORING OPTIONS  
AVAILABLE IN THE BUSH FIRE POLICY

AREA OF CONSIDERATION	MAJOR POLICY PROVISIONS	COMMENTS
Prevention	<ul style="list-style-type: none"> <li>- Court fines ranging between ₵10,000.00 and ₵100,000.00</li> <li>- Raising public awareness and education of the hazards of bush fires by the District Assembly Sub Committee on bush fires</li> </ul>	<ul style="list-style-type: none"> <li>- Fines are too small to deter culprits and saboteurs.</li> <li>- For lack of technical staff and logistical support coupled with Ghanaians long-standing acceptance of hazards, there should be establishment and maintenance of a permanent National Bush Fire Management section to tackle the issue of public education.</li> </ul>
Mitigation	<ul style="list-style-type: none"> <li>- Restrictive laws.</li> <li>- Early burning programme</li> </ul>	<ul style="list-style-type: none"> <li>- Legal framework tends to fall short of full effectiveness unless rigidly enforce. Awarding of prizes seemed to be a better alternative.</li> <li>- Burning in any form or time is detrimental and harmful to man and his environment.</li> </ul>
Preparedness	<ul style="list-style-type: none"> <li>- Training of Fire Volunteer Squads</li> </ul>	<ul style="list-style-type: none"> <li>- Training should cover all collaborators.</li> <li>- The policy was silent on preparations of pre bush fire plans (contingency plans)</li> <li>- Also silent on provision and maintenance of resources.</li> </ul>
Response	<ul style="list-style-type: none"> <li>- Establishment of Fire Volunteers Squads</li> </ul>	<ul style="list-style-type: none"> <li>- The policy does not establish a detailed programme for bush fire control.               <ol style="list-style-type: none"> <li>i. Silent over the functions of the fire volunteers.</li> <li>ii. No established fire detection programme</li> <li>iii. No legal provision for Fire Volunteers defence and security</li> </ol> </li> </ul>
Recovery	-	<ul style="list-style-type: none"> <li>- Recovery measures are necessary since they relieve bush fire victims from physiological, psychological and sociological trauma.</li> </ul>
Monitoring and Feedback	<ul style="list-style-type: none"> <li>- DA sub Committee tasked to compile data on all bush fire outbreaks and offences and report to institutions like DA, GNFS etc</li> </ul>	<ul style="list-style-type: none"> <li>- Low data and information requirement for effective monitoring and feedback.</li> </ul>

Source: Author's construct (June, 2002)

### 3.3.2.1 Prevention

Prevention covers those measures, which are aimed at impeding the occurrence of a disaster event and or preventing such an occurrence having harmful effect on communities. The major positive approaches towards prevention of bush fires in the bush fire policy are;

- (i) Court fine of not less than ₵10,000.00 or more than ₵100,000.00 or community labour not exceeding twelve months or to both (Section 11 (I).
- (ii) Public awareness and education of the hazard of uncontrolled bush fires by the Bush Fire Control Sub-committee of the Assembly. Section 6 (e).

Traditionally, Ghanaians have long-standing acceptance of hazards. They believe themselves to have lived for centuries with a recurring major bush fire problem. Therefore, the need for preventive measures is relaxed. This therefore calls for an adequate assessment and monitoring of bush fires and vulnerabilities, so that the need for prevention is accurately identified and defined. This would lead to accurate evaluation of all reasonable bush fire prevention programmes. In this regard, it is especially important to achieve sensible cost-benefit comparisons; for example, whether, by instituting preventive measures, the nation and community is going to gain more, as against the losses, which may arise if nothing is done. In this context, the establishment and maintenance of autonomous permanent Bush Fire Management committee can play a vital important part than the Assembly's sub-committee, which most of the times lack technical staff and logistical support.

It also needs mentioning that the bush fire legislation fines are too small to deter some culprits and saboteurs who are determined to burn properties worth million of cedis.

### 3.3.2.2 Mitigation

Mitigation refers to measures, which are aimed at reducing the impact of bush fires on a nation or community. With this definition, the basic assumption is that, whilst it maybe possible to prevent some disaster effects, other effects will obviously persist. The bush fire policy recognises this and maintains the application of;

- (i) restrictive laws; and
- (ii) early burning programme. Section 6 (i)

The Technical Background Paper of Disaster Mitigation in Asia and the Pacific 1990) has commented that the legal framework tends to fall short of full effectiveness unless they are rigidly enforced, and thus, recommended incentives which often provide better inducement for mitigation. The above fits best in the Ghanaian situation, since the study unravelled non-enforcement of bush fire laws as one of the major reasons of incessant bush fires. So seasonal awarding of bush fire-free communities with prizes would have been a better alternative.

### 3.3.2.3 Preparedness

In fact, it can almost be said that every aspect of bush fire management affects, or is affected by preparedness. Preparedness measures enable governments, organisations, communities and individuals to respond rapidly and effectively to bush fire situations. Preparedness measures include the formulation of a viable pre bush fire plans (contingency plans), the maintenance of resources and training of personnel.

Training is obviously an important component in preparedness. The bush fire policy requires Ghana National Fires Service (GNFS) to train the Fire Volunteers who are to fulfil or assist in emergency situation (Section 10). But is it the Fire Volunteers who only need to be trained? Training should cover all collaborators in the fight against bush fires, be it governmental or non-governmental. The Fire Personnel who were interviewed during the study responded affirmatively when asked whether they want to be trained as a trainer of Volunteer Fire Fighters.

A pre-bush fire plan is a survey of a potential fire hazard and a plan for fighting bush fire. The plan includes the key matters that influence a fire attack. The purpose of a pre-fire plan is to enable attack preparations and fire fighting operations to be carried out at the scene of a fire as efficiently as possible (Carter and Ransch, 1994). It was, however, sad to learn that the bush fire policy is silent about this all-important document and not to

mention provision and maintenance of resources. All that the policy said was "The sub-committee shall regulate its own procedure" (section 4 (4), without any elaboration. This and many others confirm the fact that the bush fire policy was drawn in a rush and does not show the Government's commitment in any way.

#### 3.3.2.4: Response

Response measures are those, which are taken immediately prior to, and following bush fire outbreak. Such measures are directed towards saving life and protecting property and to dealing with the immediate damage caused by the disaster. Response operations usually have to be carried out under disruptive and sometimes traumatic conditions. Often, they are difficult to implement and they tend to make heavy demands on personnel, equipment and other resources.

It must be pointed out that the law only establishes a legal basis for a bush fire prevention programme; it does not establish a programme for bush fire controls. Even with the town, area or unit Fire Volunteer Squads, the law only mentions their establishment without their functions (Section 7).

At present there is no established fire detection programme or facilities available to assist in the detection. Detection depends primarily upon educating local people to spot bush fires, give alarm, and direct village fire volunteer squads to the scene as rapidly as possible without the assistance of radio or telephone communication, or vehicle.

As mentioned above, response operations are most often carried under traumatic conditions. The study discovered that some Fire Volunteers at "Brahohoo" and "Pamdu" in the Nkoranza and Kintampo districts respectively met their untimely death in their bid to protect bush fires from spreading. There is also a case still under Wenchi Police investigation, where a Fire Volunteer was assaulted for challenging a group of hunters suspected to have caused a bush fire. It is sad to learn that the bush fire policy does not provide any legal defence and security for the Fire Volunteers.

#### 3.3.2.4 Recovery

Recovery is the process by which communities are assisted in returning to their proper level of functioning following an outbreak of fire. Recovery measures are necessary since they relieve bush fire victims from physiological, psychological and sociological trauma. Recovery programmes range from emergency feeding through relocation and evacuation to resettlement. Unfortunately, the bush fire policy does not define any strategy for recovery.

#### 3.3.2.5 Monitoring and Feedback

There is no doubt that the experience and lessons gained from a fire event can be utilised to improve many aspects of future bush fire management. Kessey (1995) comments that monitoring in order to react to the changing policy environment is crucial for effective policy implementation.

The bush fire law under section six (6), however, tasks the sub-committee to monitor bush fire and compile data on all bush fire outbreaks and offences within the district and submit these reports quarterly to certain-named-institutions.

It must be emphasised here that this data alone cannot help to achieve optimum utilisation of post fire experience. Normally, post fire-disaster review needs to be as comprehensive as possible and must include aspects like.

- i. Status of plans, mitigation measures and preparedness prior to the outbreak.
- ii. Communication
- iii. Assignment of tasks to organisations involved in the fire operations.
- iv. Provision of information for recovering programmes, and
- v. Research requirements revealed by the outbreak.

#### 3.3.3 Potency arrangement at various levels of Government

Ideally, a policy for effective implementation purposes must have a management structure as identified in the conceptual framework. Within this frame, one has to identify the system of roles and responsibilities for carrying out the implementation process

(Kessey 1995). The structural frame of the existing National Bush fire policy is shown in Table 3.3, and it is reviewed within the four (4) levels of the new planning system viz town/area/unit, district, regional and national levels.

TABLE 3.4: MANAGEMENT FRAME OF THE BUSH FIRE POLICY IN GHANA

LEVEL	ROLE	MEMBERSHIP	RESPONSIBILITY
1. National	-	-	-
2. Regional	-	-	-
3. District	District Assembly (sub committee)	Includes; <ul style="list-style-type: none"> <li>• District Fire Officer</li> <li>• District Forestry Officer</li> <li>• District Wildlife Officer</li> <li>• District Agric. Extension Officer</li> <li>• District Animal Health and Production Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Draw bush fire by-law</li> <li>• Specify periods in the year, which the burning of farm slash, grass, herbage and dead wood shall be prohibited.</li> <li>• Draw up district early burning programme</li> <li>• Set up town, area and unit bush fire control committees</li> <li>• Educate residents of the district on the hazards of uncontrolled fires</li> <li>• Compile data on all bush fire outbreaks and offences within the district.</li> </ul>
4. Town/area/unit	Bush Fire Control Committees	-	Direct the activities of the Fire Volunteers Squads

Source: Author's construct (June, 2002). Information from the bush fire policy

The management frame of the bush fire policy as shown in Table 3.3 identifies the structures only at the lower levels of government viz district and town/area/unit. Even with that, while membership of the District Assembly sub-committee is named, the policy is silent on the membership of the bush fire control committee at the town/area/unit level. With this, there is the possibility of influencing the membership, thus defeating the objective of the policy, since the right personnel will not be put there.

The neglect of structures at the middle and top levels of government is seen as a major managerial defect in the policy. At the moment, there is a conflict of interest between GNFS, Department of Forestry, and EPA, NADMO and some NGOs as to who is the general co-ordinator responsible for the implementation of the bush fire policy. For instance in July 2001 the Forestry Department organised a one-day stakeholder workshop in Kumasi to manage fires in the transition zone, and at the apex of the Management Implementation structure was the Ministry of Lands and Forestry. The study also found out that while the National Bush Fire Prevention Week was organised by NADMO, that of the region was organised by GNFS. These institutions play complementary roles and they need to be coordinated at the middle and top level of Government to ensure effectiveness.

Policies are influenced at the top level of government, and it is no surprise that ever since the bush fire policy was formulated, there had not been a single review. All because the policy lacks structures at the top level of government. It needs mentioning that situations like this do not support smooth and effective policy implementation.

### **3.4 Formulation and implementation of the Policy**

#### **3.4.1 Communities Involvement in the Formulation of the Policy.**

Bush fire policy implementation requires the participation and acceptance of the population as well as that of government agencies and officials. To implement a policy successfully, government authorities must take into account the receptivity and demands of those whom the policy will affect. If a policy or some of its elements are resisted by the public, the chances of success are greatly reduced or nullified. It is in this direction that communities; community leaders, chiefs and policy target groups must be involved in the formulation of a bush fire policy.

Table 3.5 illustrates respondents' answers to the question whether they were involved in the formulation of the bush fire policy and the district bush fire byelaw.

TABLE 3.5: RESPONDENTS ANSWERS ON THEIR INVOLVEMENT IN THE FORMULATION OF THE BUSH FIRE POLICY AND THE DISTRICT BYELAWS ON BUSH FIRE PREVENTION AND CONTROL

DISTRICT	WERE YOU INVOLVED IN THE FORMULATION OF THE BUSH FIRE POLICY?		WERE YOU INVOLVED IN THE FORMULATION OF THE BUSH FIRE BYELAW?	
	YES	NO	YES	NO
1. Kintampo	Nil	50	2	48
2. Asutifi	Nil	50	2	48
TOTAL	Nil	100	4	96
PERCENTAGE	Nil	100	4	96

Source: Author's Construct (June, 2002)

It is clear from the table that none of the respondents was involved in any way – in the formulation of the policy. A situation which does not augur well for the smooth implementation of the policy. Since the communities – the beneficiaries of the policy – will not show commitment to the policy.

The non-involvement of the communities in the formulation of the policy could be explained by the prevailing political atmosphere at the time the policy was formulated. Invariably policy is the product of the prevailing conditions. Kessey (1995). The policy was formulated under Rawling's military regime and the procedure was highly centralised in Accra. The study revealed that the policy was drafted by the then 35 member National Anti-Bush Fire Committee (NABFC), and the final approval given by the PNDC committee of secretaries. Membership of the NABFC consisted of representatives from selected technical institutions in Accra like GNFS, EPC, Forestry Department and Game and Wild Department. The communities were again neglected in the formulation of the District Assemblies bush fire by-laws, only the District Coordinating Director and GNFS were involved. The choice of GNFS was perhaps due to the assumption that the service knows better in matters relating to fire, and assumed, by extension that its decisions were also those best for the people. This is a false reasoning or argument, in the sense that the communities are the proper judges of where their long-

term interest lies. The policy should not be a technical document but the expressed aspirations of the rulers and the ruled.

It is a fact that planners at the national level are too much influenced by national political considerations. Hence, they relegate community interest to the background. It becomes necessary therefore, to involve the chiefs, Assembly members and for that matter the local people in policy formulation for they know best the local problems and constraints. More so, activities of administrators and decision makers can be much better monitored and controlled by the local people.

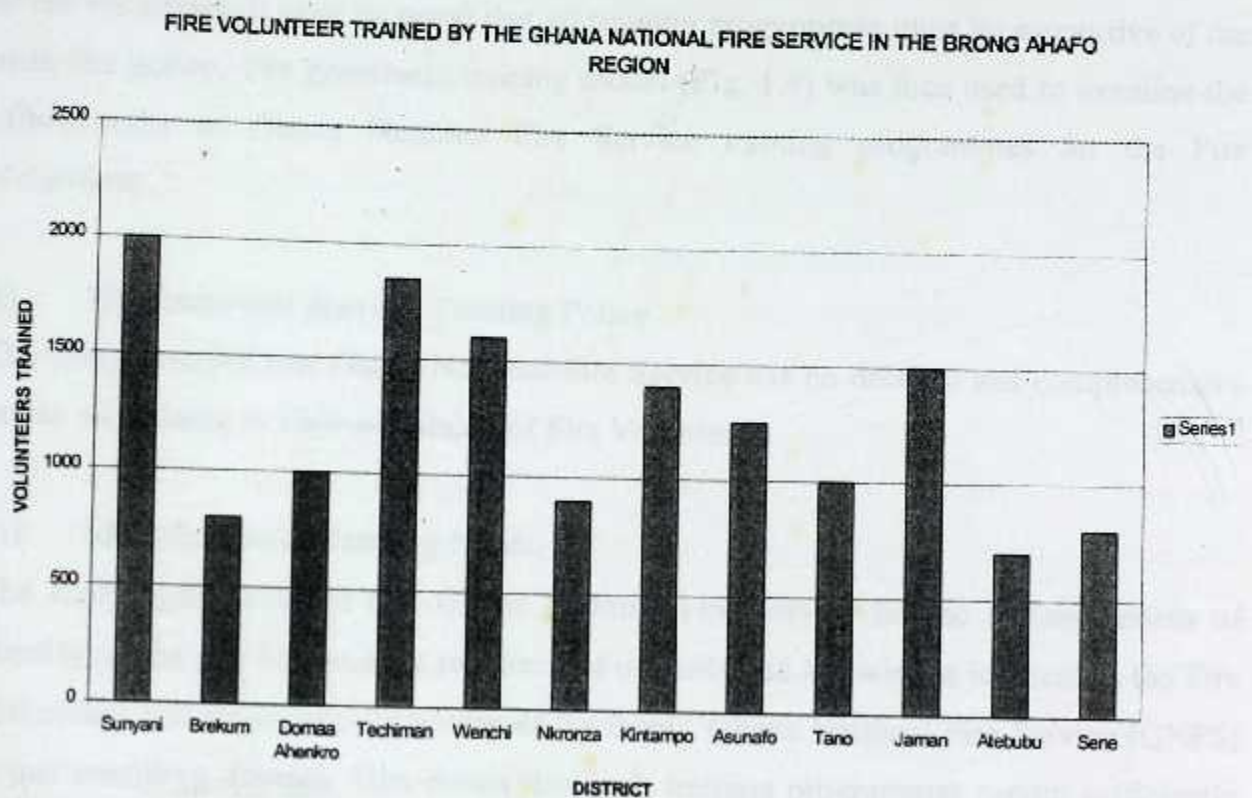
### 3.4.2 Implementation of the bush fire policy

It is thus believed that once a public policy has been made, implementation will follow orderly and very automatically to achieve the goals desired by the policy makers. The study therefore saw the need to examine how far some major elements of the bush fire policy have been implemented.

#### 3.4.2.1. Formation and Training of Community Fire Volunteer Squads

The National Fire Service which traditionally has been responsible for urban and industrial fires has been organising and training local volunteers to serve as the first line of attack against bush fires. The Ghana National Fire Service (GNFS) maintains a Rural Fire Division – established in 1987, – which is responsible for general prevention, suppression and fighting of bush fires in the country. According to the service's records, a total number of 16,600 Fire Volunteers were trained within the period under study. The breakdown in districts is shown in Fig. 3.4.

Fig. 3.3: FIRE VOLUNTEERS TRAINED BY GHANA NATIONAL FIRE SERVICES (GNFS) IN THE BRONG AHAFO REGION



Source: Author's Construct (June, 2002)

With a total area of 39,557 km<sup>2</sup>, it was estimated that an average area per volunteer in the Brong Ahafo Region would be about 2.4 km<sup>2</sup>. With this figure, one would therefore not have expected the bush fire situation in the region to have been so alarming. A cross check of Ghana National Fire Service (GNFS) records with the actual situation on the ground (that is, in the four studied communities) revealed that averagely about a third of the Fire Volunteers trained do remain in the group as active members. Reasons for the dropout are considered in section 3.5 of this study.

Most of the Fire Volunteers were children in their teens and elderly people rather than able-bodied men.

### 3.4.2.1.1 Effectiveness of Training Programmes

Training is without doubt, a means to enhancing the quality of personnel. Fire Volunteer training should be done with a view to increasing the efficiency, productivity and safety of the volunteers. It must be noted that all training programmes must be supportive of the bush fire policy. The systematic training model (Fig. 1.4) was thus used to examine the effectiveness of Ghana National Fire Service training programmes for the Fire Volunteers.

#### (i) Organisational plan and Training Policy

The study revealed that Ghana National Fire Service has no detailed and comprehensive policy on training in view of training of Fire Volunteers.

#### (ii) Identification of Training Needs.

The study again revealed that Ghana National Fire Service has no defined means of identifying the gap between the requirement of skills and knowledge inherent in the Fire Volunteers and those actually possessed by them. Ghana National Fire Service (GNFS) is just muddling through. This means that such training programmes cannot sufficiently address the task ahead. Hence the participation of the training programmes by the volunteers might not have resulted in the improvement of their skills.

#### (iii) Planning of Training Programmes

The contents of the training programmes of the two (2) districts were found to be the same. This was because it was the same instructors at the Regional Headquarters, Sunyani who used to go round to train the Fire Volunteers at the districts. The contents were found to be reflecting on issues generally considered essential to the prevention and control of bush fires, viz, foot drills, bush fire legislation, physical training, fire prevention and fire fighting.

#### (iv) Implementing the Training Programme

Evidence showed that Ghana National Fire Service (GNFS) finds it difficult to disseminate or implement its training programmes for lack of implementing equipment

and logistics. Funding of the programmes comes from the District Assemblies who most of the times showed uncooperative attitude. They preferred spending on Assembly's projects to the training of Fire Volunteers. The end result was that majority of the programmes had short duration and wrong timing.

#### (v) Evaluation of Training

Evaluating the training programme is essential in that it serves a feedback upon which the training process can be adjusted for better results in any future training programme. The Fire Volunteers who are the beneficiaries of the training programme were made to evaluate the training programme by assessing their worth.

The Quality Assessment technique (Table 3.5) of the Capacity Variance Analysis was used to analyse the data. By this model, the quality of each Fire Volunteer was assessed in terms of his or her Knowledge, Skill and Ability (KSA) as against the variables or the key teaching areas, viz, foot drill, fire prevention, fire fighting and physical training. Weights were assigned according to volunteers' response in order to determine variations between ideal and existing capacity for each volunteer. A maximum measure ranging from a high level of three points to medium level of two points to a low level of one point was assigned to each indicator. The cumulative weighted averages for the 30 volunteers were computed for each indicator for both the ideal and existing capacity. The variance scale that determined the level of quality was obtained by dividing the actual total score on Knowledge, Skill and Ability (KSA) by the expected total score and the results expressed in percentage. The final result was interpreted by relating to a decision rule adapted from Mensah-Abrampa (1996).

#### Decision Criteria

- Seventy (70) per cent and above - High capacity
- Above fifty (50) percent - Medium capacity
- Fifty (50) per cent and below - Low capacity.

TABLE 3.6. FIRE VOLUNTEERS QUALITY ASSESSMENT FRAMEWORK

Position	Indicators (Major teaching areas)	Weighted Cumulative Averages						Sub. Scores	
		Knowledge		Skill		Ability			
		Expected	Actual	Expected	Actual	Expected	Actual	Expected	Actual
Fire Volunteer	Foot Drill	3	2	3	2	3	2	9	6
	Fire prevention	3	1	3	1	3	1	9	3
	Fire Fighting	3	2	3	1	3	1	9	3
	Physical Training	3	2	3	2	3	1	9	5
	TOTAL	12	7	12	6	12	5	39	18

Source: Author's Construct (June, 2002) Data from field survey.

The variance scale computed from Table 3.5 is 50 percent, representing a low capacity. This is however, a good indicator of ineffectiveness of Fire Service training for the volunteers. It is evident from the table that Fire Volunteer training consists mainly of para-military exercises and lacked the basics of tactical fire prevention and fire fighting. More so, as the Fire Volunteers knowledge in the courses thought was a bit higher, they lacked the experience and hence the ability to exercise their functions effectively.

#### 3.4.2.2 Enactment of District Assembly Bush Fire Bye-Laws

For effective prevention and control of bush fires, the District Assemblies were empowered by the policy to draw their own bye-laws. This is compatible with section 79 (1) of the Local Government Act, 1993 (Act 462). For a bye-law to be valid, section 80 (1-4) of the Local Government Act, 1993 asserts that it should be submitted to the Minister of Local Government for approval or rejection. However, the bye-law shall not have effect until it has been published in the Gazette. This is where the District Assemblies were found wanting. The District Assemblies contacted have their own bush fire bye-laws, but they have not been gazetted, making them invalid. A contact made at the Attorney-General Department, Sunyani confirmed that none of the Districts in the region has its bush fire bye-law gazetted. A situation which made it impossible for the Police to prosecute bush fire offenders at Law Courts.

### 3.4.2.3 Establishment of Bush Fire Control Sub-committees of District Assemblies and Town/Area/Unit Bush Fire Control Committees

The bush fire policy made provision for the establishment of two (2) committees at the District Assembly and the Town/Area/Unit levels of government. These are the bush fire control sub-committee of the District Assembly and the bush fire control committee of the Town/Area/Unit level.

The study found out that the District Assemblies have not constituted the sub-committees. Issues related to bush fires were directed to the Justice and Security Sub-committee. Looking at the number of chieftaincy cases and numerous security problems at the districts, bush fire matters were found relegated to the background.

The situation at the Town/Area/Unit level was not different from that of the districts. The bush fire control committee was found not in existence. Instead, the Fire Volunteers were found turned themselves into a bush fire policing task force. Offenders were tried by a court which comprised of the Executives of the Fire Volunteers. Funds raised from these courts fines were shared among the Fire Volunteers and some put into the Association's coffers. However, people who knew their rights and were able to challenge the legality of the courts and the fine went scot free.

### 3.4.2.4 Raising of awareness

There is a provision in the bush fire policy for the general public to be well informed about the benefits derived from the bush land when they are carefully managed, and the damage caused by their destruction through fire. The study however required knowing about the level of the public awareness in relation to the above.

It was observed that the public is well informed about the causes and effects of bush fires. It was learnt that this has been made possible particularly as a result of public information programmes organised by the FM radio stations in the region. However, while the public seemed to know about the PNDC Law 229, few people about 10% of the respondents knew of the existence of the District Assembly by-law.

In effect, the study observed that the public has full awareness of the consequences of bush fires and behaved in an affected way towards burning of the bush. But the problem is how to stop burning the bush. A group of men the study came across at Kintampo explained that, they simply could not resist the urge to hunt when dry season – the main hunting season – comes. Because they depend on hunting for their livelihood. But unfortunately, fire is used as the agent. They explained the use of fire as the main agent of hunting for the following reasons; Firstly, it helps to drive animals in a desired direction and thus makes hunting easier. Secondly, because hunting in the tall grass is usually uncomfortable and in many cases even impossible, so they prefer to burn it, and thirdly, they fear snakes so much that they do not hesitate to burn the bush in order to drive snakes away.

It is therefore clear from the above that, the future of Ghana's bush land to be greater extent depends on the Government's practical demonstration to raise the rural people's standard of living and maintain it in a permanent way so as to reduce pressure and unacceptable practices on the land.

### **3.5 Policy Implementation Problems**

The study unravelled a number of problems hindering the smooth implementation of the policy. For the purpose of clarity, the problems are presented under the following headings; Policy gap, Institutional gap and Resources gap.

#### **3.5.1 Policy Gap**

- i. There were conflicting statutes with other National policies especially on the organisation of the Fire Volunteers, thus putting the Fire Volunteers in a fix
- ii. Uncoordinated bush fire activities at the regional and national levels of government allowed all stakeholder agencies to do whatever deemed fit to them.

### 3.5.2 Institutional Gap

- i. Insufficient education and training of Fire Volunteers
- ii. Lack of co-ordination between all stakeholders (Police, Ghana National Fire Service (GNFS), Fire Volunteers, District Assemblies and the like) at the district level.
- iii. The issue of ungazeted bye-laws posed problems for the police in prosecuting offenders of the bye-law at the Law Courts.
- iv. Dwindling Fire Volunteers spirit due to poor security and welfare conditions.
- v. Low public awareness on the content of the policy and the District Assembly bye-law.

### 3.5.3. Resource Gap.

- i. Lack of financial and other logistical support to enable all stakeholders function effectively.

## CHAPTER FOUR

### KEY FINDINGS AND RECOMMENDATIONS

#### 4.1 Introduction

The previous chapter went a long way to inform that much was required to be done on the bush fire policy. The purpose of this chapter is to sequentially present the observational summaries and make recommendations for interventions.

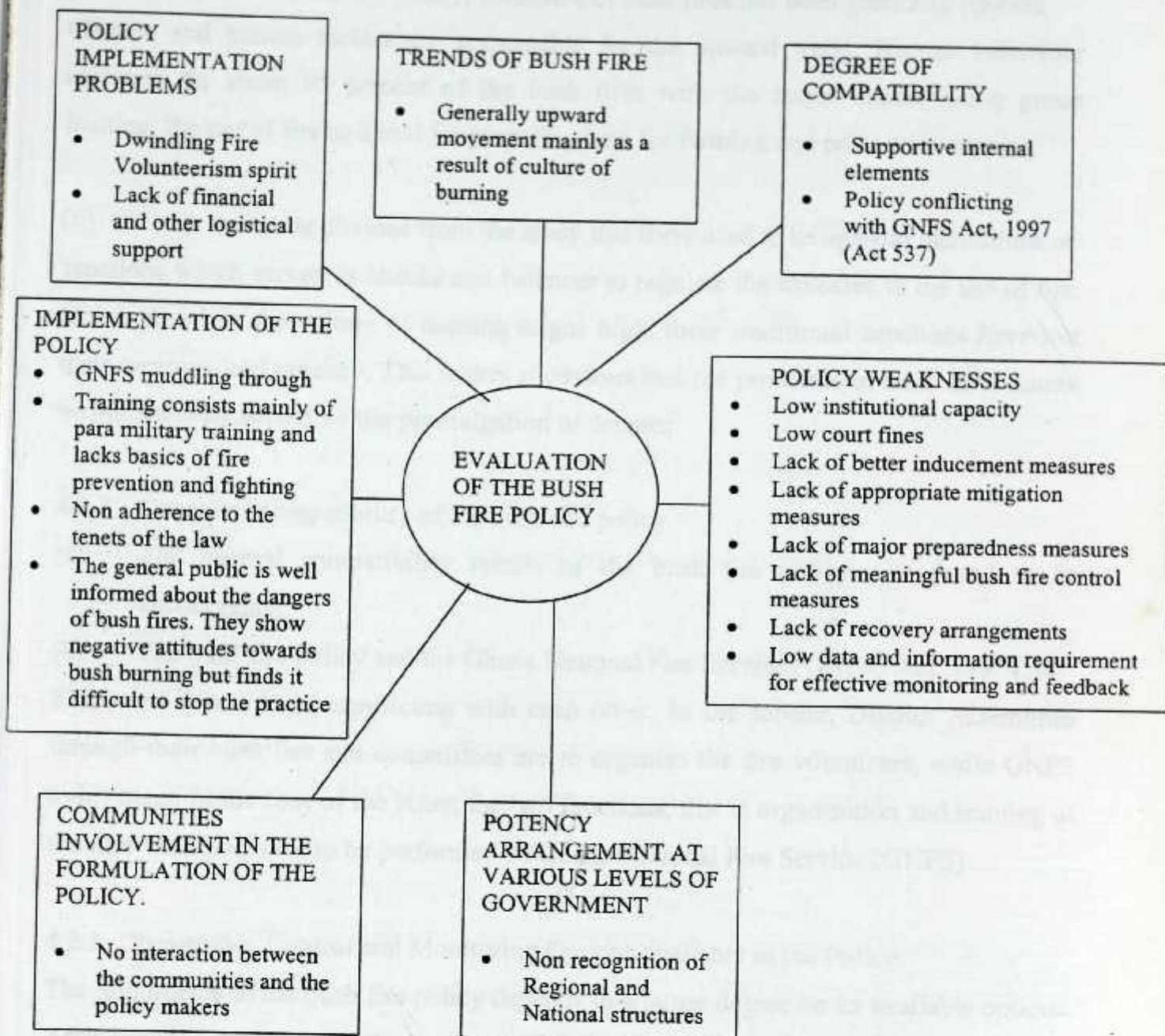
#### 4.2. Key Findings

For the purpose of clarity, this has been done in line with the main building blocks of the work, namely

- a. Trend of bush fires
- b. Degree of compatibility of the bush fire policy
- c. Prevention, control and monitoring options available in the policy.
- d. Potency arrangements at various levels of Government.
- e. Communities involvement in the formulation of the policy
- f. Implementation of the bush fire policy
- g. Policy implementation problems.

The major findings are shown in Figure 4.1.

Figure 4.1 EVALUATION Establishment of bush fire control sub-committee OF THE BUSH FIRE POLICY – KEY FINDINGS.



Source: Author's Construct (June, 2002)

#### 4.2.1 Trend of bush fires

The policy goal of the bush fire law is to prohibit bush fires.. The major findings of the study were that:

(a) Despite the bush fire policy, incidence of bush fires has been generally upward. Climate and human factors are responsible for the upward trend. Human behaviour accounts for about 95 percent of the bush fires with the major causes being group hunting, the use of fire as a tool for preparing land for farming and palm wine tapping.

(b) It was quite obvious from the study that there used to be age-old institutions or sanctions which served as checks and balances to regulate the excesses in the use of fire. However, while the culture of burning reigns high, these traditional sanctions have lost their meaning and potency. This makes it obvious that the problems of bush fires cannot be immediately solved by the promulgation of decrees.

#### 4.2.2 Degree of compatibility of the bush fire policy.

(a) The general compatibility results of the bush fire policy was found to be encouraging.

(b) The bush fire policy and the Ghana National Fire Service (GNFS) Act, 1997 (Act 537) were found to be conflicting with each other. In the former, District Assemblies through their bush fire sub committees are to organise the fire volunteers, while GNFS trains them. In the case of the latter, the two functions, that is organisation and training of the Fire Volunteers are to be performed by Ghana National Fire Service (GNFS)

#### 4.2.3 Preventive, Control and Monitoring Options available in the Policy.

The importance of the bush fire policy depends to a larger degree on its available options. After analysing the options, the study found out that:

(a) There is the need for an adequate assessment and monitoring of bush fires and vulnerabilities to identify and define needs for bush fire prevention. The study however, doubts the capacity of the District Assembly sub committee to undertake this assignment. The bush fire legislation fines ranging between

€10,000 and €100,000.00 were found to be too small to deter some culprits and saboteurs.

- (b) The policy lacks better inducement for mitigation, that is, it relies mostly on its Legal framework. But the legal framework is not rigidly enforced, hence falling short of its effectiveness. The early burning programme is also considered not as a better alternative to bush fire mitigation.
- (c) Provision is made in the policy for training of only Fire Volunteers, leaving aside training of all other stakeholders. Major preparedness measures like drawing of contingency plans, provision and maintenance of resources are also left out.
- (d) The policy does not establish any meaningful programme for bush fire control. The Fire Volunteers are the first line of defence, and while their work is known to be risky and dangerous, the policy failed to provide any legal defence and security for them.
- (e) No recovery arrangements were made in the policy to enable communities and individuals return to their proper levels of functioning after falling victims to bush fires.
- (f) Quarterly reports on number of bush fires and offences alone cannot help to achieve optimum utilisation of post bush fire experiences as feedback policy.

It could therefore be deduced from the above that options made available in the bush fire policy are inappropriate and inadequate. It is doubtful whether this could effectively handle Ghana's bush fires. The hypothesis that "there is a positive relationship between inappropriate government policies and occurrence of bush fires" is therefore valid.

#### 4.2.4 Potency arrangement at various levels of Government.

Management structures as defined in the bush fire policy ends up at the district level. Co-ordination at both the regional and national levels were vividly lacking. The result is pursuance of parochial interest and purposeless overtures by all stakeholders.

#### 4.2.5 Communities involvement in the formulation of the Policy

The policy was made during the Rawlings Military regime, and that the process was highly concentrated in Accra, thus no effort was made to ascertain the aspirations, needs and desires of the communities. Formulation of the District Assembly bye-laws also

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towed the same line. Technocrats and Administrators decided for the public. The study observed that the local people have the tendency to identify local problems and constraints, and can better monitor and control activities. Hence, they need to be involved in policy formulation.

This coupled with the assertion made earlier on (in Section 2.2.3) that the potency of community participation is an effective management tool of projects makes the second hypothesis – promotion of community participation in the formulation of bush fire laws contributes substantially to the management of bush lands valid.

#### 4.2.6 Implementation of the bush fire policy.

- (a) Ghana National Fire Service (GNFS) has no organisational policy or corporate plan in support of Fire Volunteer training. Fire Volunteer training was found consisting of mainly paramilitary exercises and lacks the basics of fire prevention and tactical fire fighting.
- (b) The District Assemblies have their own bush fire by-laws, but they have failed to gazette them hence making them invalid.
- (c) The general public is well informed about the hazards of bush fires. They show negative attitudes towards bush burning, but find it difficult to stop the practice.

#### 4.2.7 Policy implementation problems.

Dwindling volunteerism spirit and lack of finance and other logistical support were found as the major policy implementation gaps.

### 4.3 Recommendations

Following the discussions so far made, the following recommendations are made to ensure successful bush fire prevention and control activities in Ghana.

#### 4.3.1 Improving the existing bush fire policy

The preceding chapters identified the existing bush fire policy as non-participatory, inadequate, and externally not supportive. Four key areas have been identified to be

considered in the new policy. These are policy formulation and implementation process, institutional development, policy provisions and enforcement of statutes.

(i) Policy formulation and implementation process.

It is recommended that any meaningful bush fire policy formulation and implementation process must exhibit a continuous, participatory, bottom-up, aspirations and desires from the unit level. Effective involvement must be the prime motive of the Government.. All the identifiable stakeholders must be involved. The collated ideas must be subjected to public scrutiny as required by the Local Government Act, 1994 (Act 462).

For effective co-ordination of bush fire activities among the various levels of governments, the study however recommends the implementation structure shown in figure 4.2.

(ii) Institutional development

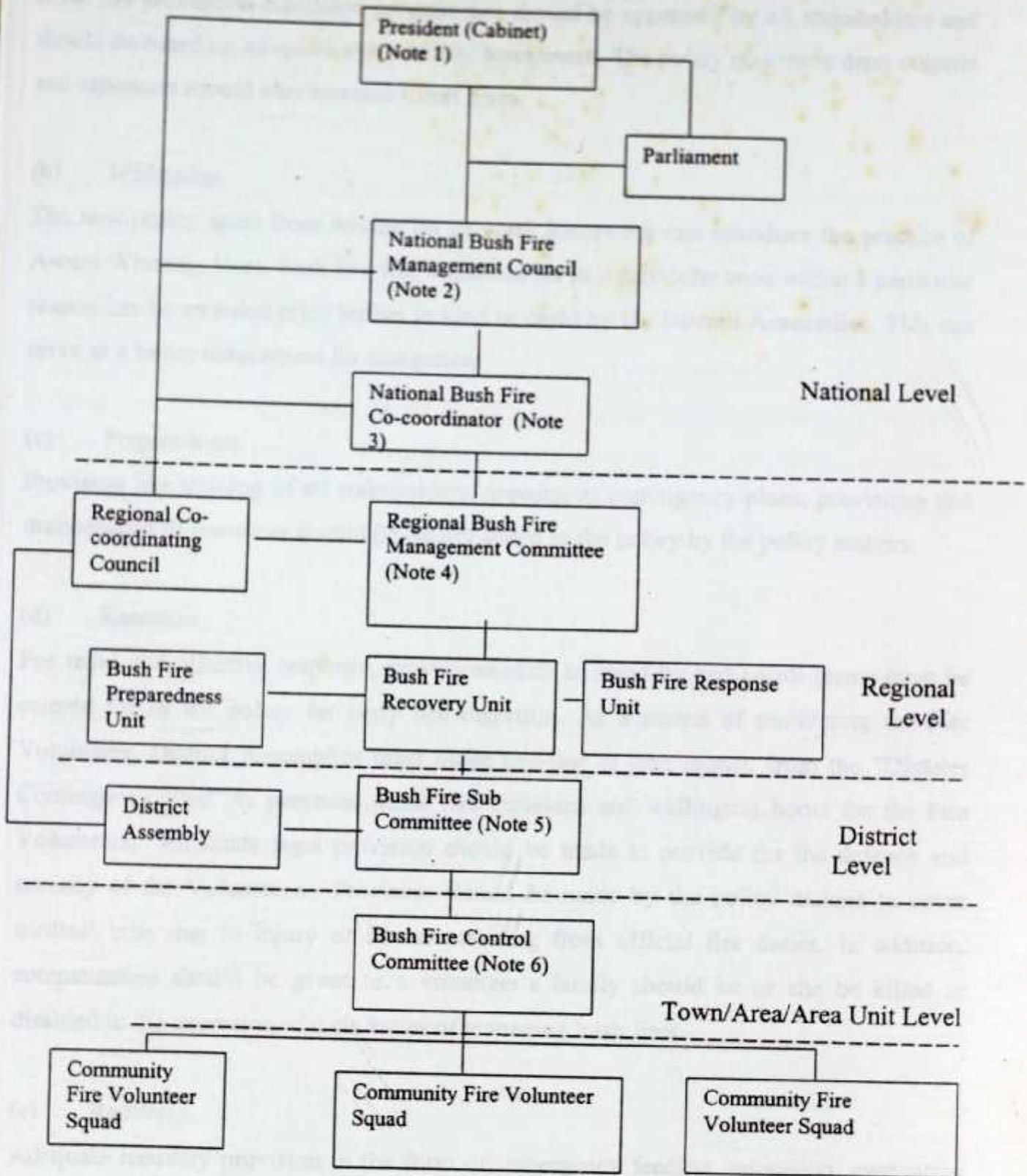
Preventing and protecting the bush land from fires depends on the existence of an appropriate institutional framework, including both the public and private sectors. The public sectors basically requires an appropriate national institutions to be charged with the management of the bush land, closely linked to, and co-ordinated with the other levels of government.

The co-ordinating centres for the process at each level should be clearly established by the policy and they should be recognised, and more importantly central Government must see to it that the institutions have the capacity in terms of skills, resources and authority to perform. The functional linkage between the co-ordinating centres and actors at all levels should be unambiguously defined by the policy and see to be complied with.

(iii). Policy provisions

Available provisions in the new policy should adequately and appropriately cover all the elements of the bush fire management cycle, viz prevention, mitigation, preparedness, response, recovery and monitoring and feedback.

FIGURE 4.2: CONCEPTUAL BUSH FIRE IMPLEMENTATION STRUCTURE



Source: Author's construct (June, 2002)

## (a) Prevention.

Bush fire prevention education programmes should be organised by all stakeholders and should be based on adequate vulnerability assessment. The policy makers to deter culprits and saboteurs should also increase Court fines.

## (b) Mitigation

The new policy apart from relying on its legal framework can introduce the practice of Award Winning. Here, bush fire-free communities in a particular zone within a particular season can be awarded prize (either in kind or cash) by the District Assemblies. This can serve as a better inducement for mitigation.

## (c) Preparedness.

Provision like training of all stakeholders, drawing of contingency plans, provisions and maintenance of resources should be clearly stated in the policy by the policy makers.

## (d) Response.

For rapid and effective response, provisions such as stand-by and patrol teams must be catered for in the policy for early fire detection. As a means of motivating the Fire Volunteers, District Assemblies must make bye-law to take money from the "Disaster Contingency fund" to purchase items like cutlasses and wellington boots for the Fire Volunteers. Adequate legal provision should be made to provide for the defence and security of the Volunteers. Provision should be made by the policy makers to cover medical bills due to injury or illness resulting from official fire duties. In addition, compensation should be given to a volunteer's family should he or she be killed or disabled in the execution of their duties of managing bush fires.

## (e) Recovery.

Adequate recovery provision in the form of emergency feeding, relocation, evacuation and resettlement should be highlighted in the policy. Resources could be solicited from the Civil Society, NGOs, and from both the District and National Disaster Funds depending upon the magnitude of damage.

(f) **Monitoring and Evaluation**

Provision should also be made in the policy by policy makers for post disaster review, information collection and research. With this, new demands will emerge to either revise or abandon the policy.

In all cases, policy makers must ensure that there is compatibility within and between other policies.

(iv) **Enforcement of Statutes.**

All the statutes in the policy must be enforced by all stakeholders. This requires that personnel at relevant positions should be educated on the interpretations of the statutes, authority and roles of respective institutions under the policy. It is of utmost importance to ensure that the general public is well informed about the policy, this is related to education.

#### **4.4 Conclusion**

Attempts to control bush fires in Ghana have so far been superficial. Analysis of the National Bush Fire Policy (Control and Prevention of Bush Fire Law, 1990 - PNDC L 229) shows that the policy is non participatory, inadequate, not supportive and inoperative. It is therefore recommended that the Government should improve the existing bush fire policy.

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APPENDIX 1A

QUESTIONNAIRE FOR EVALUATING THE BUSH FIRE PREVENTION AND CONTROL POLICY IN GHANA.

RESPONDENTS: FIRE VOLUNTEER

GENERAL INFORMATION.

- 1. Town/Village.....Date .....
- 1. Name.....Sex.....Age..... Marital status.....  
Occupation..... Education.....
- 3. Do you experience bush fires in your community? Yes [ ] No. [ ]
- 4. If yes, what could have caused these bush fires?  
(a) (b)  
(b) (c)  
(c) (f)
- 5. Since when did you become a fire volunteer? .....

POTENCY ARRANGEMENTS

- 5. Is there any command structure for fire Volunteers?  
Yes [ ] No [ ]
- (a) Town/Area/Unit level.....  
(b) District .....
- (c) Regional .....
- (d) National .....
- 7. Does your District Assembly support Fire Volunteer activities in any way? Yes [ ]  
No. [ ] (elaborate) .....

AWARENESS AND PARTICIPATION

- 8. What do you know about the bush fire policy (PNDC Law 229) .....
- 9. (a) Do you know about the District's bye-law controlling bushfires? Yes [ ]  
No. [ ]  
(b) What are some of the clauses? .....
- (c) Do you have copies? Yes [ ] No. [ ]
- 10. Were you or the fire volunteer squad involved in the making of these two documents?  
Bush Fire Policy Yes [ ] No [ ]  
District bye-law Yes [ ] No [ ]

POLICY AND PRACTICE

- 11. Since when have you been involved in the Fire Volunteer activities.....
- 12. How many people are in your squad? .....
- 13. Is the training given to you by Fire Service adequate? Yes [ ] No. [ ]
- 14. List the types of training Fire Service gives to you and their grading in percentage.

TYPE	RANK	GRADE (%)
(a)		
(b)		

(c)

(d)

(e)

Total

100%

**POLICY IMPLEMENTATION**

15. What kind of fire fighting equipment are you trained to USE? .....
16. (a) Are these equipment available for their use? Yes [ ] No. [ ]  
(b) How do you rank their availability?.....
17. Do you at times arrest bushfire offenders? Yes [ ] No. [ ]
18. If yes, how do you handle such cases? .....
19. Do you receive funds or resources from any quarters to carry out your activities  
Yes [ ] No [ ]
20. If Yes, from which sources? .....
21. If No, how do you fund your activities?.....
22. Do you have problems with the Police/Fire Service/or any other persons(s) or  
groups in the handling of bush fire offenders? Yes [ ] No. [ ]

**POLICY IMPLEMENTATION PROBLEMS**

23. What fire fighting equipment are appropriate and effective in your area but are in  
short supply or not available? .....
24. What are the major obstacles that you face? .....
25. Give suggestions as to how volunteer fire fighting could be enhanced in your  
community?.....

APPENDIX 1B

QUESTIONNAIRE FOR EVALUATING THE BUSH FIRE PREVENTION AND CONTROL POLICY IN GHANA.

RESPONDENTS: GHANA POLICE SERVICE

GENERAL INFORMATION.

- 1. Name of Respondent.....District..... Rank.....  
Date.....
- 1.1. Do you experience bushfires in this district? Yes [ ] No. [ ].
- 1.2. If yes, what are some of the causes of these fires?  
 (a) \_\_\_\_\_ e) \_\_\_\_\_  
 (b) \_\_\_\_\_ f) \_\_\_\_\_  
 (c) \_\_\_\_\_ g) \_\_\_\_\_  
 (d) \_\_\_\_\_ h) \_\_\_\_\_
- 3.0. Are you aware of the existence of the bush fire policy and the District Assembly bye-laws? Yes [ ] No. [ ]
- 4.1. Do you have problems charging bush fire offenders under these law? Yes [ ] No. [ ]
- 4.2. If yes, what needs to be corrected/done? .....

ROLE AND PRACTICE

- 12. Do you think being a member of a fire suppression team comes with any incentives or respect? Yes [ ] No [ ]
- 13. If yes, what are some of these incentives?  
 (a) \_\_\_\_\_  
 (b) \_\_\_\_\_
- 14. Do you think the fire volunteer services should be continued in your community?  
 Yes [ ] No [ ]
- 15. Are any bush fire offenders handled in this community?
- 16. Do you appreciate the work of the Fire Volunteers/Police Fire-Service as far as offenders of bush fires are concerned? Yes [ ] No [ ] (Give reasons)

POLICY IMPLEMENTATION PROBLEMS

- 17. What do you think are the major problems confronting the Fire Volunteers in this community?
- 18. Suggest any solutions to address these problems.
- 19. What do you think should be the contribution of the members in the community to make the work of the Volunteer fire fighters effective?

**APPENDIX 1C**  
**QUESTIONNAIRE FOR EVALUATING THE BUSH FIRE PREVENTION AND CONTROL POLICY IN GHANA.**

RESPONDENTS: COMMUNITY MEMBERS

GENERAL INFORMATION.

1. Town/Village.....Date.....
1. Name .....Sex..... Marital status.....  
 Occupation.....  
 Education.....
3. Do you experience bush fire in your community? Yes [ ] No. [ ]
4. Do you perceive bushfires as a threat to life and property in your community?  
 Yes [ ] No. [ ]
5. What are some of the causes of these bushfires?.....

POTENCY ARRANGEMENTS

5. Does your community involve itself in fire suppression activity? No [ ] No. [ ]
6. Do you have special people in the community or a committee who do this kind of work, who are they? (a) ..... (b) .....

AWARENESS AND PARTICIPATION

7. Are you aware that there is a law that prohibits bushfires? Yes [ ] No. [ ]
8. If yes, what is that law?.....
9. Are you also aware that the Assembly has a by-law that prohibits bush fires?  
 Yes [ ] No. [ ]
10. If yes, have you ever seen that law? Yes [ ] No [ ]
11. If yes, was your community involved in the making of the laws? Yes [ ] No. [ ]

POLICY AND PRACTICE

12. (a) Do you think being a member of a fire suppression team comes with any incentives or respect? Yes [ ] No [ ]  
 (b) If yes, kindly mention some of those incentives.....  
 (c) If no, give reasons.....
13. Do you think the fire volunteer activities should be continued in your community?  
 Yes [ ] No. [ ]
14. How are bush fire offenders handled in this community?.....
15. Do you appreciate the work of the Fire Volunteers/Police. Fire Service so far as offenders of bush fires are concerned? Yes [ ] No [ ] (Give reasons) ...

POLICY IMPLEMENTATION PROBLEMS

16. What do you think are the major problems confronting the Fire Volunteer squad in this community?
17. Suggest any solutions to address these problems.....
18. What do you think should be the contribution of the members in the community to make the work of the Volunteer fire fighters effective?.....

APPENDIX 1D

QUESTIONNAIRE FOR EVALUATING THE BUSH FIRE PREVENTION AND CONTROL POLICY IN GHANA.

RESPONDENTS: DISTRICT ASSEMBLY

GENERAL INFORMATION.

- 1.1. Name of Respondent.....District.....Rank.....  
Date.....
- 1.2. Do you experience bushfires in your district? Yes [ ] No. [ ]
- 1.3. Do you perceive bushfires as a threat to life and property in your district? Yes { }  
No [ ]
- 1.4. If Yes, list some of the threats..... of the
- 1.5. If yes, list some of the threats.  
(a) (d)  
(b) (e)  
(c) (f)

POLICY ARRANGEMENT

- 2.1 Do you have Fire Volunteers in your district? Yes [ ] No. { }
- 2.2 If yea, does the Assembly support Fire Volunteer activities in any way? Yes [ ]  
No [ ]  
(elaborate) .....
- 2.3 Is there any command structure for the Fire Volunteers? Yes [ ] No. [ ]  
(elaborate) (a) Town/Area/Unit  
level.....  
(e) District .....
- (f) Regional .....
- (g) National .....

AWARENESS AND PARTICIPATION

- 3.1' What do you know about the bushfire policy (PNDC Law 229) .....
- 3.2. (a) Do you have bye-laws preventing and controlling bush fires in the district?  
Yes [ ] No. [ ]
- (b) If yes, what are some of the clauses? .....
- (c) Can you give me a copy? Yes [ ] No [ ]
- (d) Is the bye-law gazetted? Yes [ ] No [ ]
- 3.1 What Departments, organization or persons were involved in the making of the  
boy-law?.....

POLICY AND PRACTICE

- 4.1 Are Fire Volunteers in your district up to the tasks assigned them? Yes [ ] No. [ ]  
(elaborate) .....

- 4.2 How are bushfires offenders handled in the district? .....
- 4.3 Do you at time encounter problems with the Fire Volunteers/Police/Fire Service/Opinion Leaders in having bushfires offenders prosecuted at law courts? Yes [ ] No. [ ] (elaborate) and give reasons) .....

**POLICY IMPLEMENTATION PROBLEMS**

- 5.1 What are the major obstacles faced by the District in suppression of bushfires? .....
- 5.2 Give suggestions as to how this could be solved? .....

**GENERAL INFORMATION**

Name of Respondent: \_\_\_\_\_ District: \_\_\_\_\_ Rank: \_\_\_\_\_ Date: \_\_\_\_\_

APPENDIX 1E

QUESTIONNAIRE FOR EVALUATING THE BUSH FIRE PREVENTION AND CONTROL POLICY IN GHANA.

RESPONDENTS: GHANA NATIONAL FIRE SERVICE

GENERAL INFORMATION.

1. Name of Respondent.....District..... Rank..... Date.....
2. Do you experience bushfires in your district? Yes [ ] No [ ]
3. How many times do you experience bushfire?  
(a) annually (b) every other year 9c) once every three years.
4. Do you perceive bushfire as a threat to life and property in your district? Yes [ ]  
No [ ]
5. If yes list some of the threats  
(a) .....  
(b) .....  
(c) .....  
(d) .....  
(e) .....
6. What are some of the course of these bush fires? .....

POTENCY ARRANGEMENTS

- 2.1 Is there any command structure for fire volunteers? Yes [ ] No. [ ] elaborate
  - a. Town/Area/Unit level .....
  - b. District .....
  - c. Regional .....
  - d. National .....
- 2.2 Does your District Assembly support Fire Volunteer activities in any way? Yes/  
No  
(elaborate) .....
- 2.3 Which other department/organisation do support volunteer fire fighters in your district?.....

AWARENESS AND PARTICIPATION

- 3.2 In your opinion, what can be done to prevent these bushfires?  
(a)..... (d).....  
(b)..... (e).....

- (c) ..... (f) .....
- 3.2. What do you know about the bushfire policy (PNDC Law 229).....
- 3.3 Do you know about the District's bye-laws preventing and controlling bushfires?  
Yes [ ] No [ ]
- (b) What are some of the clauses? .....
- (c) Do you have copies in your office? Yes [ ] No. [ ]
- 3.4 Was Fire Service involved in the making of these two documents?  
- Bushfire Policy Yes [ ] No. [ ]  
- District bye-law Yes [ ] No. [ ]

POLICY AND PRACTICE

- 4.1 Since when have you been involved in training volunteer fire fighters in this district?.....
  - 4.2 How many villages/communities have you trained so far? .....
  - 4.3 In all , how many people have you trained already? .....
  - 4.4 List the types of training you give to volunteer fire fighters and their grading (percentage)
- | TYPE  | RANK | GRADE (%) |
|-------|------|-----------|
| (a)   |      |           |
| (b)   |      |           |
| (c)   |      |           |
| (d)   |      |           |
| (e)   |      |           |
| TOTAL |      | 100%      |
- 4.5 Is the training given to fire volunteers adequate? Yes [ ] No. [ ] (give reasons).....
  - 4.6 Do you need to be retrained as a trainer of Volunteer Fire Fighters Yes [ ] No [ ]
  - 4.7 Are fire fighters in your district up to the tasks assigned them? Yes [ ] No [ ]  
(elaborate) .....
  - 4.8 How are bush fire offenders handled in this district? .....
  - 4/8 Do you have problems with the Fire Volunteers/Police. Or any other groups in the handling/prosecuting of fire offenders at the law court? Yes [ ] No. [ ]  
(elaborate and give reasons) .....

POLICY IMPLEMENTATION PROBLEMS

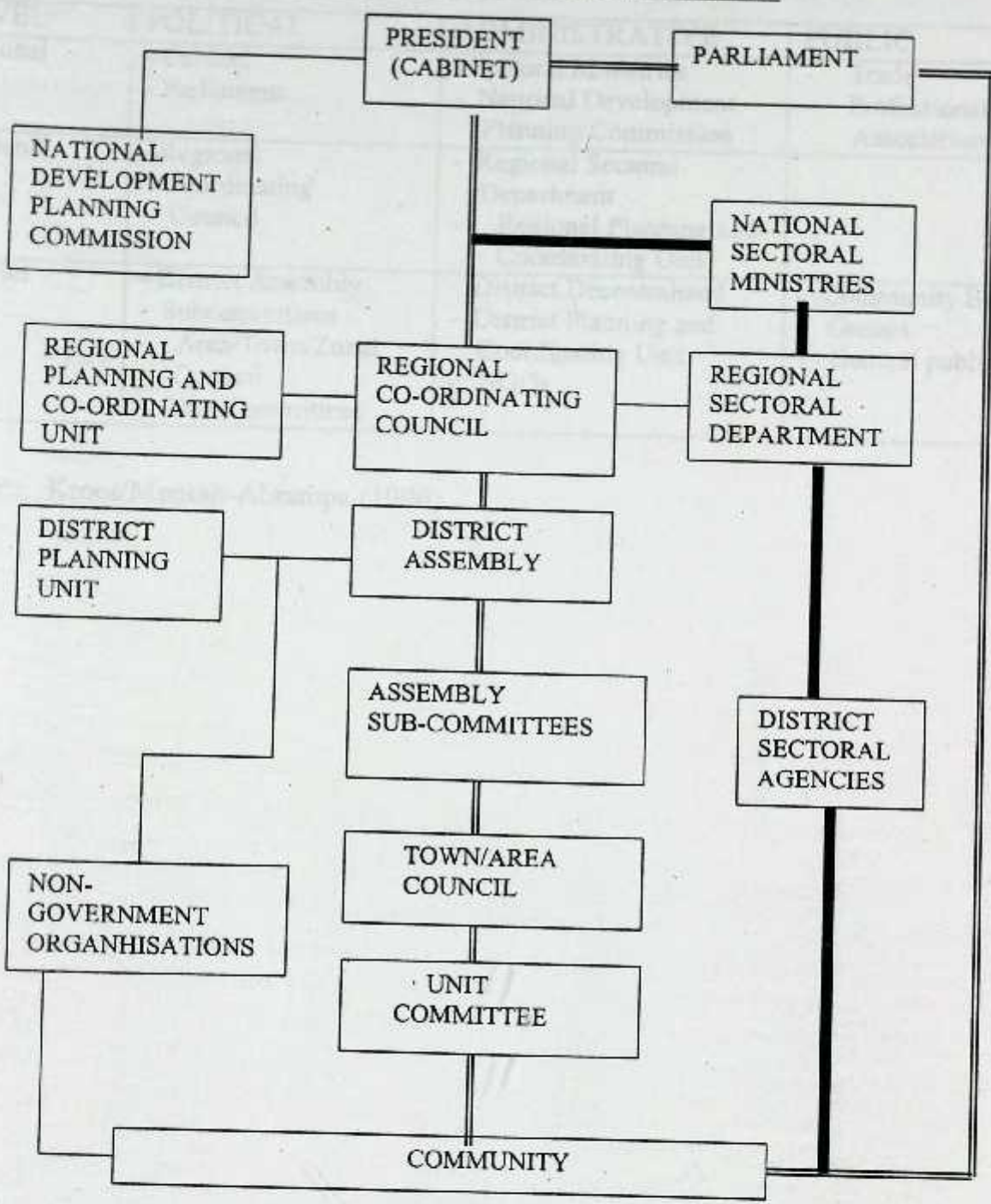
- 5.1 What are the major obstacles faced by fire volunteers in your district .....
- 5.2 Give suggestions as to how volunteer fire fighting could be enhanced in the district.....

**APPENDIX II****LIST OF INFORMAL DISCUSSIONS**

1. Mr. Kwame Oppong Frempong (DCFO) – Regional Commander, Ghana National Fire Service, Brong Ahafo Region.
2. Mr. Atta Ameyaw (DO III) – Regional Bush Fire Co-ordinator, Ghana National Fire Service (GNFS) – Brong Ahafo Region.
3. Dr. K. Nsiah-Gyabaa – Principal, Sunyani Polytechnic
4. Dr. T. K. Orgle – Director, Forest Research Institute of Ghana (FORIG)
5. Nana Osuodugya Barima Kwame Bonsu - Hweddiem Manhene
6. Mr. N. E. K. Nsiah – Chairman Brong-Ahafo Regional Fire Volunteers Association

APPENDIX III

CONCEPTUAL POLICY FORMULATION PROCESS



————— Political                      ————— Supervisory  
 ————— Administrative                ————— Collaborative

Source: Gunter Kroes/ Mensah-Abrampa (1996)

## APPENDIX IV:

## ACTORS IN GOAL FORMULATION AND IMPLEMENTATION

LEVEL	POLITICAL	ADMINISTRATIVE	PUBLIC
National	<ul style="list-style-type: none"> <li>- Cabinet</li> <li>- Parliament</li> </ul>	<ul style="list-style-type: none"> <li>- Sectoral Ministries</li> <li>- National Development Planning Commission</li> </ul>	<ul style="list-style-type: none"> <li>- Trade</li> <li>- Professional Associations</li> </ul>
Regional	<ul style="list-style-type: none"> <li>- Regional Coordinating Council</li> </ul>	<ul style="list-style-type: none"> <li>- Regional Sectoral Department</li> <li>- Regional Planning and Coordinating Unit</li> </ul>	
District	<ul style="list-style-type: none"> <li>- District Assembly</li> <li>- Subcommittees</li> <li>- Area/Town/Zonal Council</li> <li>- Unit Committees</li> </ul>	<ul style="list-style-type: none"> <li>- District Decentralized</li> <li>- District Planning and Coordinating Unit</li> <li>- NGOs</li> </ul>	<ul style="list-style-type: none"> <li>- Community Base Groups</li> <li>- General public</li> </ul>

Source: Kroes/Mensah-Abrampa (1996)

## APPENDIX V

## ESTABLISHING RELATIONSHIP BETWEEN RAINFALL AND BUSH FIRE OUTBREAKS

USING THE SIMPLE REGRESSION TECHNIQUE

FORMULA:

$$\text{Regression 'r'} = \frac{SS_{xy}}{\sqrt{SS_{xx} \cdot SS_{yy}}}$$

Where:

$$(i) \quad SS_{xy} = \sum xy - \frac{(\sum x)(\sum y)}{n}$$

$$(ii) \quad SS_{xx} = \sum x^2 - \frac{\sum x^2}{n}$$

$$(iii) \quad SS_{yy} = \sum y^2 - \frac{\sum y^2}{n}$$

TABLE:

YEAR	X (RAINFAL L	Y BUSH FIRE OUTBREAKS	XY	X <sup>2</sup>	Y <sup>2</sup>
1990	909.0	47	42723.0	826281	2209
1991	1138.3	31	35287.3	1295726.9	961
1992	1003.1	76	76235.6	1006209.6	5776
1993	980.1	83	61348.3	960,596.01	6889
1994	962.2	93	89484.6	925828.84	8649
1995	1401.6	151	211641.6	1964482.6	22801
1996	1257.8	100	125780.0	1582060.8	10000
1997	923.9	110	101629.0	853591.21	12100
1998	977.4	65	63531.0	955310.76	4225
1999	1178.2	60	70692.0	1388155.2	3600
TOTAL	10731.6	816	898352.4	10592043	77210

Source: Author's Construct (June, 2002)

CALCULATIONS: RISK FIRE MANAGEMENT CYCLE

$$\begin{aligned}
 SSXY &= 898352.4 - \frac{(10731.6)(816)}{10} \\
 &= 898352.4 - 875698.56 \\
 &= \underline{\underline{22653.84}}
 \end{aligned}$$

$$\begin{aligned}
 SSXX &= 10592043 - \frac{(10731.6)^2}{10} \\
 &= 10592043 - 11516724 \\
 &= \underline{\underline{-924680.06}}
 \end{aligned}$$

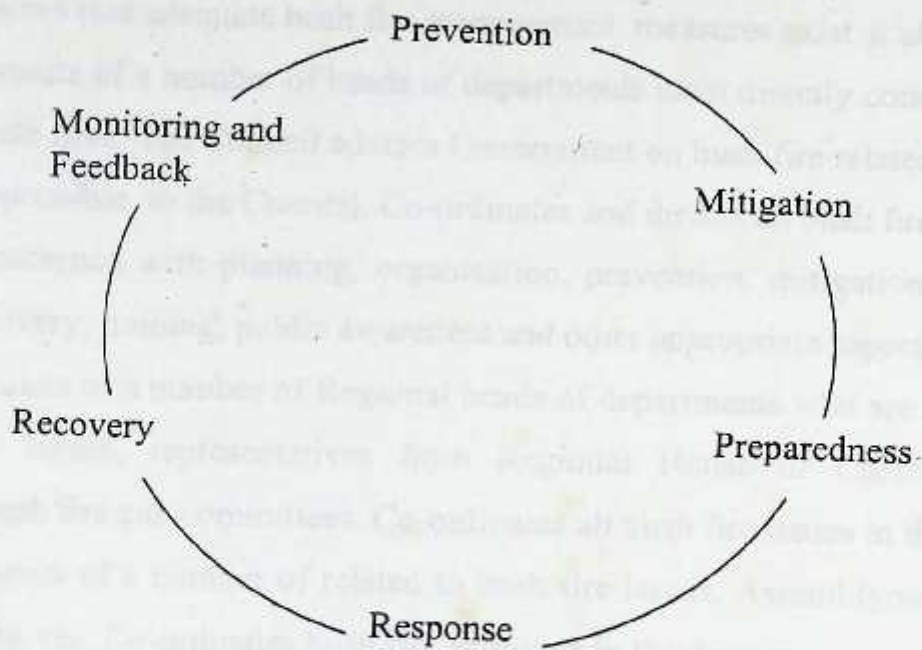
$$\begin{aligned}
 SSYY &= 77210 - \frac{(816)^2}{10} \\
 &= 77210 - 66585.6 \\
 &= \underline{\underline{10624.4}}
 \end{aligned}$$

$$\begin{aligned}
 \therefore r &= \frac{SSXY}{\sqrt{(SSXX)(SSYY)}} = \frac{22653.84}{\sqrt{-924680.00 \times 10624.4}} \\
 &= \frac{22653.84}{-99116.96}
 \end{aligned}$$

ANSWER:

$$\begin{aligned}
 r &= \underline{\underline{-0.23}} \\
 r^2 &= \underline{\underline{0.53 \text{ or } 5\%}}
 \end{aligned}$$

## APPENDIX VI. : BUSH FIRE MANAGEMENT CYCLE



Source: Author's Construct (June, 2002)

## APPENDIX VII: NOTES ATTACHED TO THE CONCEPTUAL BUSH FIRES MANAGEMENT IMPLEMENTATION STRUCTURE

- Note 1 – Ensures that adequate bush fire management measures exist at all times.
- Note 2 - Consists of a number of heads of departments most directly concerned with and deals with bush fires. The Council advises Government on bush fire related issues.
- Note 3 – Responsible to the Council. Co-ordinates and directs all bush fire-related matters which are concerned with planning, organisation, prevention, mitigation, preparedness, response, recovery, training, public awareness and other appropriate aspects.
- Note 4 – Consists of a number of Regional heads of departments who are directly related to bush fire issues, representatives from Regional House of Chiefs and District Assemblies bush fire sub committees. Co-ordinates all bush fire issues in the region.
- Note 5 – Consists of a number of related to bush fire issues, Assemblymen and women, opinion leaders, etc. Co-ordinates bush fire activities in the district.
- Note 6 – Membership consists of chiefs and elders, assemblymen and women, unit committee leaders, religious leaders, teachers and the like.