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DEPARTMENT OF DEVELOPMENT STUDIES

AN ASSESSMENT OF THE FARM MANAGEMENT PRACTICES ON PRISON FARMS AND THE IMPLICATION TO FOOD PRODUCTION: CASE STUDY OF THE BUEA CENTRAL PRISON FARM AT LYSOKA, BUEA

A Project Report submitted to the Department of Development Studies, in Partial Fulfillment of the Requirements for the Award of a Higher Technical Diploma in Development Studies with specialization in Peace and Humanitarian Action

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CERTIFICATION

This is to certify that this piece of work entitled "***An Assessment of the Farm Management Practices on Prison Farms and the Implication on Food Production: Case Study Lysoka***" is the original work of Wolani Shudzeka Etiene.

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DEDICATION

This work is dedicated to the Wolani and the Fasin families and to my son Shudzeka Free Shinyuy.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

BCP: Buea Central Prison

MINJUSTICE: Ministry of Justice

FAO: Food and Agriculture Organization

HRs: Human Rights

MDGs: Millennium Development Goals

UN: United Nations

ha: hectare

LUP: Land Use Planning

OF: Organic Fertilizers.

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ABSTRACT

The study assessed the farm management practices on the Buea Central Prison farm at Lysoka and the implication to food production. Desktop review, interviews and observation were used. Findings revealed that the poor crop production and food insecurity in the Buea Central Prison are directly linked to the various farm management practices in the Buea Prison farm. These farm management practices included slash and burn, minimum tillage and zero tillage. Contributions from external partners are also of little concern. Major stakeholders' lay little attention on planning and management of prison farms. There is therefore the need for concerted actions for the management of these farms in order to improve production.

RÉSUMÉ

Cette étude a évalué les diverses pratiques de gestion agricole au champ pénitentiaire de la Prison Centrale de Buéa et leurs impacts sur la production alimentaire. La revue documentaire, les interviews et l'observation étaient les méthodes utilisées. Les résultats ont révélé que les faibles rendements de la production agricole et l'insécurité alimentaire dans la prison centrale de Buéa sont directement liées aux différentes pratiques de gestion agricole du champ pénitentiaire de Buéa qui sont entre autres l'agriculture itinérante sur brulis, le remuage minimal du sol ainsi que les semailles directs sur des espaces brulés et, les contributions des partenaires externes sont peu importantes. Les principaux intervenants consacrent peu d'attention sur la planification et la gestion des champs-prisons. Il y a donc nécessairement besoin d'actions concertées pour la gestion de ces champs pénitentiaires en vue d'accroitre la production agricole.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Three-quarter of the released prisoners from the Buea Central Prison (BCP) return to the prison shortly (BCP, 2014). Some do so for their third, fourth, and even sixth time. This phenomenon called "recidivism" is becoming a real problem in the Buea community in general and BCP in particular.

The prison charge of amending prisoners, securing the society, preparing inmates for their social re-insertion and finally ensuring their social rehabilitation is like training dangerous people and sending them to endanger the peace, stability, safety, security and even the development efforts of this community of legendary hospitality. On the 11 February 2015, three prisoners who were out for a work party were arrested stealing in a Nexttel Building in Molyko.

According to Hapi, quoted by Tatchouang (2010), "a prison is a school of most active delinquency". Some prisoners often transform themselves to beggars on their way to court, begging for food to eat and even harassing people they meet on their way. The BCP inmates are most often idle; they are poorly and insufficiently fed, as they are fed with banana rejects from the CDC banana farms. They spend their time playing cards, smoking, begging from visitors etc. a popular adage says that "an idle mind is the devil's workshop" and another says that "an empty stomach has no ears". All they do is sharing their criminal experiences, methods, techniques and strategies to sustain a living within the penitentiary.

This leads to the question, why should the BCP inmates be hungry, poorly fed and, be transformed to beggars when having a huge farm land of 36 ha in Lysoka (Buea)? Worst still, work on the land thrice a week?

Throughout the world, land planning, farming methods, practices and eventually land management has a serious effect on food yield (Yerima and Van Ranst, 2005). According to the later, poorly managed lands result to low crop yields and vice versa.

However, the proper management of agricultural farms must be preceded by planning which is unfortunately not taken into consideration by most farmers (Tabi et al, 2012). The situation becomes more serious in Africa with very low soil fertility and the most vulnerable to the effects of climate change. Apart of lack, the limitations in giving land planning special concern, most methods of farm practices for agricultural production remain obsolete and rudimentary, hampering world food security.

1.2 Statement of the problem.

The BCP with a population of about 711 prison inmates (BCP, 2015), has a prison farm in Lysoka where, prisoners go farming three times a week. Unfortunately, these prison inmates are poorly fed. They work much, sacrifice a lot of energy and yet eat less.

Knowing that a hungry man is an angry man, the implementation of intensive social rehabilitation programs and activities such as leisure, games, cultural, educational activities etc. into the prison must be preceded by the basic needs of inmates such as their fundamental Human Rights to food and food security. To this effect, the Buea prison farm at Lysoka (36 ha) is supposed to contribute in improving the feeding conditions of the BCP inmates by ensuring food sufficiency and food security into this prison and involving them as much as possible in all the farming practices to avoid idleness.

Furthermore, given that "the prison's budget is insufficient" (MINJUSTICE, 2013), the food needs of the prisoner can only be possible if the farming practices in the Buea Lysoka prison farm can move from subsistence farming to second generation agricultural farming practices with sustainable land management. "In most prisons one meal is served daily with an average daily ratio of CFAF98 per inmate" (MINJUSTICE, 2013). From this, we can clearly understand that a normal being cannot feed on CFAF98 a day and, seeking for the means to improve on feeding conditions of prison inmates through farming techniques and sustainable prison farm land management is of dire concern.

1.3 Objective of the study

1.3.1 General objective

To assess the farm management practices at the Buea Central Prison farm and the implication to food production.

1.3.2 Specific objectives

-To assess various farm management practices on the Buea prison farm at Lysoka;

-To assess stakeholders perspectives towards planning and management of prison farms.

-To identify the effects of farm management practices on food yields, well-being and health status of prison inmates.

1.4 Research questions

- What are the various farm management practices on prison farms?

- What are the various stakeholders' views towards land planning and management practices of prison farms?

- How do the farm management practices affect food yield, well-being and health of prison inmates?

1.5 Significance of the study

Taking into consideration the fact that the rehabilitation of prisoners is a gateway to enhancing security in our communities, thereby contributing to the development of the said communities and, that the success of this delicate mission passes through satisfying the inmates' basic and fundamental needs like their HRs to food, this study will go a long way to ensuring that farming practices in our prison farms are improved upon and that the prison farms' output is increased to improve on the prison inmates livelihood.

Secondly, contribute in reducing idleness with all its ills for the effective and efficient preparation of prisoners for their social rehabilitation through agricultural activities amongst others. Hence, this study will be extended into four essential dimensions to which practical, social, scientific and professional.

1.5.1 The practical dimension

This study will contribute in the fight against poor and insufficient feeding of prison inmates by improving through second generation agricultural farming practices and sustainable farm land management to improving the living conditions of Cameroon prison inmates, in achieving food security in our prisons and even in the training of both prison inmates and prison staffs members in new farming practices without leaving aside its contribution in reducing idleness in our penitentiaries.

1.5.2 The social dimension

Prisoners are people who have deviated from the social norms and rejected by the society. Thus the society is very careful with them since it does not trust them any longer and more is very afraid of them; restoring this lost trust and acceptance of prisoners by this same society will be an important asset for the achievement of a concerted and sustainable agriculture in the prison milieu. It should be noted prisoners cannot work alone and, a sustainable development most bring together all the various stakeholders in a concerted partnership. This will also go a long way to enhancing their effective preparation to social rehabilitation.

1.5.3 The scientific dimension

We think that exploiting another path in development studies will interest researchers and development students dig out many other means, techniques and strategies for the development and wellbeing of prison inmates, thereby suggesting answers and recommendations that can be used by law makers, policy makers, development and humanitarian actors just to name a few, to bring life, hope and assistance for the

understanding of the humanitarian and development emergencies arising from the prison establishments and their subsequent influences to the development efforts of our communities.

This will contribute in creating awareness as the general public and eventual key stakeholders in this sector will acquire an in-depth understanding of the prison milieu, its eventual needs and security imperatives, bringing valuable suggestions on the major challenge of opening the prison to the outside world without compromising its security requirements.

1.5.4 The professional dimension

This work will serve as catalyst in changing the prison staff's perception of imprisonment by helping them understand the importance of adopting a positive attitude in the daily management of inmates. This eventually will make them aware in acquiring new technical skills and, combine security imperative and respect for HRs, for creating effective and efficient climate for inmates to be motivated for these life changing activities.

Furthermore, prison staff will acquire new agricultural skills as they constitute one of the major key stakeholders at all the level of the farming process.

1.6 Organization of the study

Our work will be organized into four chapters.

A. Chapter one, entitled introduction will include :
   - Background of the study
   - Statement of the problem
   - Objective of the study
   - Research questions
   - Significance of the study
   - Organization of the study
   - Definition of terms.

B. Chapter two, entitled literature review and theoretical framework will include:

- Literature review
- Theoretical framework
- Gaps identified in the literature and how the work shall attempt to fill them.

C. Chapter three, titled Research Design and Methodology includes:
   - Description of study area
   - Description of the sources of data
   - Methods of study
   - Data analysis and presentation.

D. Chapter four will be consecrated on the presentation and analysis of data and will include:
   - Presentation of the results of our study
   - Implication of the results
   - Limitations of the study

E. Chapter five will be the summary of findings, conclusions and recommendations and will include:
   - Summary of findings
   - Conclusion
   - Recommendations
   - Suggested areas for further research and finally to end with references.

1.7 Definition of terms

The terms prison, work party, agriculture, subsistence agriculture, second generation agriculture, sustainable agriculture, farm practices, land management, development, sustainable development and Human Rights will be defined.

1.7.1 Prison

The Francophone Universal Dictionary defines the prison as “a place of detention where the defendants are locked, convicted. The term also means imprisonment or place where one feels sequestered.”

Tekam (1996) defines it as “an institution in which temporary custody persons suspected of crimes or offences and seeks to amend those sentenced to deprivation of liberty for their better reintegration after their prison stay.”

1.7.2 Work party

“This is a payable service by prison inmates that can be given to individuals, a group or a collectivity by the superintendent in-charge of the prison under the conditions defined by the minister in-charge of penitentiary administration” (Decree n^{o} 92/052).

1.7.3 Agriculture

“Agriculture is a special kind of production based on the growth process of plants and animals” (Arthur, 1996). It is the totality of intentional activities that result in the growing of crops and or raising animals for human consumption (Arthur, 1996).

1.7.4 Subsistence agriculture

This concept refers to a self-contained and self-sufficient unit where all production is consumed and none is sold and where no consumer or producer goods and services from sources to the unit are purchased. Pure subsistence production is characterized by the total absence of commercialization and monetization (Clifton and Wharton, 1970).

Subsistence agriculture is self-sufficiency farming in which the farmers focus on growing enough food to feed themselves and their families. The typical farm has a range of crops and animals needed by the family to feed and clothe themselves during the year.

1.7.5 Second generation agriculture

In our simplified context, second generation agriculture is an industrialized agriculture based on advanced farming techniques with improved seeds, plants and breeds for more productivity and sustainability.

1.7.6 Sustainable agriculture

This term simply defined is an approach to agriculture that focuses on producing food in a way that does not degrade the environment and contributes to the livelihood of communities (Krista, 2012). This simple statement conveys a complex concept: that agriculture must balance production, environmental, and community development goals. It is agriculture that meets the needs of the future generations.

1.7.7 Farm practices

These are understood in our work as the various agricultural practices or techniques from a lower to greater farm productivity. These practices include tillage, no tillage, ridges, manual, animal tractions, tractorisation, terracing, crop associations, farm associations etc… (FAO, 1999a)

1.7.8 Sustainable land management

Sustainable land management is a knowledge-based procedure that aims at integrating the management of land, water, biodiversity, and other environmental resources that meet human needs while sustaining ecosystem services and livelihoods. (FAO, 1999c)

1.7.9 Development

Development is a complex issue, with many different and sometimes contentious definitions. A basic perspective equates development with economic growth. The UNDP uses a more detailed definition. According to them, development is to lead long and healthy lives, to be knowledgeable, to have access to resources needed for a decent standard of living and to be able to participate in the life of the community.

1.7.10 Sustainable development

This is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- The concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given and,
- The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

1.7.11 Human Rights (HRs)

The term HRs describes rights or entitlements that inherently belong to every human being by virtue of their personhood. HRs are the set of fundamental moral rights that are considered necessary for a life of human dignity, and are premised on respect for the equality and autonomy of individuals (Jessica, 2012).

CHAPTER TWO
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter entitled literature review and theoretical framework of the subject is the review of some studies and writings that interest our research.

2.1 Literature review

2.1.1 Feeding of prisoners

Budget allocations for the feeding of prisoners in Cameroon dropped from CFAF 2,050,800,000 in 2011 to CFAF 2,029,094,000 in 2012. This package remains insufficient to provide a balanced diet for prisoners. One meal is also served daily in all the 05 prisons of the littoral region with the exception of the central prison Douala, where inmates are entitled to 02 meals per day; one meal is served daily in all 05 prisons of the South-West Region with the exceptions of the Bavenga and Buea Upper-farms secondary prisons where inmates are served 02 meals per day (MINJUSTICE, 2013).

2.1.2 Health coverage

The budget allocated for the health of Cameroon prisoners from 2013, was similar to that of 2011, and stood at CFAF 86,513,000, which gives an annual rate of CFAF 3,604 per detainee (MINJUSTICE, 2013).

If divided by 12 months, we have a monthly rate of CFAF 300, 33 and a daily rate of CFAF 10, 011.

Data collected from prisons indicate that skin diseases, malaria, HIV/AIDS and tuberculosis are the main diseases affecting inmates, not neglecting the effects of malnutrition since, in addition to health coverage, the feeding of prisoner's remains a concern (MINJUSTICE, 2013).

2.1.3 MDGs, agriculture and land management

The MDGs are commitments by the UN to establish peace and healthy economy by focusing on major issues like poverty, children, health, women empowerment and gender related issues, diseases, development etc.

About 70% of MDGs target groups living in rural areas and for most of the rural poor, agriculture is critical component in the successful attainment of MDGs. Talking about agriculture most involve sustainability and, thinking sustainability is integrating the effective and efficient land management principles.

We realize that second generation agriculture and sustainable land management can be important assets for the development of our prisons. Its outcomes can impact every sector of the prisons' daily life namely education, health, feeding, combatting HIV/AIDs in our prisons, environmental development of our penitentiaries and even and more importantly the development of a partnership for development in this institution. With a review of the actual farm practices and complete utilization of the 36 ha of land owned by BCP at Lysoka, will eventually bring life to prisoners and reason for believing in a better future for these inmates who will after eating well, concentrate on other activities aimed at preparing them for a better social rehabilitation with a motivation from within.

2.1.4 Land Use Planning (LUP)

2.1.4.1 Central idea of LUP

Land Use Planning is an iterative process based on the dialogue amongst all stakeholders aiming at the negotiation and decision for a sustainable form of land use in rural areas as well as initiating and monitoring its implementation (Amler et al, 1999).

Land use planning provides the prerequisites for achieving a sustainable form of land use which is acceptable as far as the social and environmental contexts are concerned and is desired by the society while making sound economic sense.

The presentation of the basic principles of LUP, such as the principle of beneficiary group differentiation, the iterative nature of the process or the guidance for implementation gives a sound and iterated picture of the process.

2.1.4.2 Central idea of Land Use Planning

Wherever groups of people use land and its resources, land use is planned, being aware of it or not. Land use does not consider production only, but also land use functions such as protected areas, land recreation, road-building, waste disposal sides and use-restricted areas such as buffer zones for exhaust gases, areas for regenerating groundwater, buffer zone for traffic noise pollution, etc…

LUP is not only practiced when national authorities intervene or as a result of development co-operation projects. LUP happens in every society, even if term is not used.

The subjects of these guidelines are LUP in the context of development co-operation. It deals with cases in which an intervention occurs in order to improve land use and to sustain natural resources.

According to Amler et al. (1999), decisions made on land use in the past have resulted in the degradation of land resources, or an imbalance between supply and demand of those resources. LUP is understood here as an instrument of the technical co-operation used in the following types of projects:

a) Resources management (forestry, production systems compatible with resources and agroforestry, pasture management, nature protection, and erosion control)
b) Rural regional development
c) Community support and village development
d) Government consultation (environmental strategy planning, agricultural sector planning, development planning, assessment of land potential)

2.1.4.3 Objective of Land Use Planning.

According to Faber and Manstetten (1998), Land use planning creates the prerequisites required to achieve a type of land use, which is sustainable, socially and environmentally compatible, socially desirable and economically sound. It sets in motion social processes of decision making and consensus building concerning the use and protection of private, communal or public areas.

2.1.4.4 Principles of land use planning

According to the later, these principles include:

a) Land use planning is oriented to local conditions in terms of both method and content
b) Land use planning considers cultural viewpoints and builds up on local environmental knowledge
c) LUP takes into account traditional strategies for solving problems and conflicts
d) LUP assumes a concept which understands rural development to be a "bottom-up" process based on self-help and self-responsibility.
e) LUP is a dialogue, creating the prerequisites for the successful negotiation and co-operation among stakeholders
f) LUP is a process leading to an improvement in the capacity of the participants to plan and take actions
g) LUP requires transparency. Therefore, free access to information for all participants is a prerequisite.
h) The differentiation of stakeholders and the gender approach are core principles in land use planning
i) LUP is based on interdisciplinary co-operation. (Ecological, economic, technical, financial, social and cultural dimensions of land use make it necessary to work with an interdisciplinary approach.
j) LUP is an iterative process. It is the flexible and open reaction based on new findings and changing conditions
k) Land Use Planning is implementation- oriented

2.1.5 Land evaluation

2.1.5.1 The need for land evaluation

Land evaluation is part of the process of Land Use Planning (FAO, 1993).

In 1982, the FAO study land resources for populations of the future concluded that, of 117 developing countries examined, no less than 64 would be unable to meet the food needs of their expanded populations in the year 2000 without the use of fertilizers, pesticides, improved seeds or improved conservation measures.

In the context of land evaluation, land is much more than the solid surface of the earth. It includes the soils and rocks beneath, the atmosphere with its climates, the cyclic interchange or water between the sky, the ground, the rivers and the sea, and the whole mantle of living things, both plant and animal.

All of this subject to the aims, abilities and stupidities of the human population. And a single change in any aspect of the land can precipitate a change in many others. Understanding the complexity of land, and the snowball effects of interacting changes that occur when balances are altered by development or disturbed by changing circumstances such as population growth, is essential to successful land evaluation. It is impossible to foresee all the changes that may result from a single action. The art of land evaluation is to predict the most important changes, to decide whether these are desirable or acceptable, and thus to categorize the proposed action as a wise or as an unwise use of land (FAO, 1993).

2.1.5.2 How is land evaluated?

a) Defining objectives

b) Collecting the data

c) Identifying land uses

d) Identifying land units

e) Assessing suitability

f) Identifying environmental and socio-economic issues

g) Identifying the most suitable land use

h) Planning land use.

The essence of land evaluation is to compare or match the requirements of each potential land us with the characteristics of each kind of land (FAO, 1993).

2.1.5.3 Land evaluation concepts

a) Land suitability is evaluated for specific types of land use. Land use may be defined either at a general level (such as rain fed arable cropping) or as particular crop at a specified level of inputs

b) Evaluation includes a consideration of inputs and projected outputs: the level of material inputs is defined in the evaluation as are land improvements such as soil conservation or drainage and their overall impact is taken into account in predicting crop yields or outputs

c) Land evaluation requires specialists of different disciplines

d) Evaluation relates to the environmental and socio-economic conditions of the area: evaluation recommendations should relate to existing farming systems and to changes in land use which are technically feasible and socially and politically acceptable.

e) Suitability refers to use on a sustained basis: recommended land uses must not cause soil erosion but must conserve the land for long-term production.

f) Evaluation involves comparison of more than one land use: improving the productivity of land use systems may involve introduction of new crops, changes in land management or other innovations in existing farming system.

2.2 Assessment of some Farm Management Practices

2.2.1 Use of manure

Manure consists of animal excrement, usually mixed with straw or leaves (Gichuru et al, 2003). The amount and quantity of the excrement depend on the animals' feed. Good manure contains more than just excrement and urine. Straw and leaves are added and it is aged. Ageing is necessary to retain all the nutrients. Using aged manure is an ideal method to retain and increase the available nutrients, improve the structure and water retention capacity of the soil (Gichuru et al, 2003).

2.2.2 Use of Chemical Fertilizers

Nutrients can be directly added by the application of chemical fertilizer to the soil (Gichuru et al, 2003). However, the addition of chemical fertilizer alone is not enough to retain a sufficient level of soil fertility. If the organic matter in the soil decreases, the yield will also decrease, even if a lot of fertilizer is applied. This is due to degradation in the soil structure, a decreased capacity to retain nutrients and water, and an increased in acidity. For weathered, nutrient-poor soils in the tropics it is apparently not enough to increase the level of organic matter. In such areas, it is preferable to use an integral approach that combines the application of chemical fertilizer with an increase in the level of organic matter (Gichuru et al, 2003).

2.2.3 Composting

Like manure, compost is an ideal fertilizer. To create a compost heap, organic material (e.g. crop residues, straw, manure, kitchen wastes etc.) is collected and stored together. In this heap, micro-organisms decompose the material. Important points to note when creating compost are; moisture level (which enable bacteria and fungi to develop sufficiently), ventilation (as bacteria and fungi need oxygen to breathe and develop), temperature, and hygiene. The goal after it is spread onto a field is that compost supplies nutrients and increases the level of organic matter in the soil. A major advantage of compost is that it increases the level of organic matter in the soil, which has a positive effect on the soil organisms, soil structure, infiltration, water retention capacity and aggregate stability. Compost is rich in nutrients that are readily available to the plants (Gichuru et al, 2003).

2.2.4 Agroforestry

Agroforestry comprises all forms of land use in which woody species (trees and bushes) are grown in combination with other vegetation or animals (Gichuru et al, 2003). The most important goals are to: prevent the loss of nutrients, provide protection from wind and water erosion, provide organic mulch material, produce valuable products, and make the environment more suitable for livestock (Gichuru et al, 2003).

2.2.5 Green Fallow Periods

In a green fallow period, species are sown that have better qualities than the species that would normally grow spontaneously in the fallow period (Gichuru et al, 2003). The goal of green fallow is to quickly restore soil fertility. Traditionally, fallow periods are used to restore the soil fertility after a period of crop cultivation, and to suppress the growth of weeds that commonly grow between crops (Ndobe, 2013). The advantage of a green fallow period is that the restoration of soil fertility will take place faster. Fallow periods can be shorter, which is especially advantageous in areas where the pressure on land is intense (Gichuru et al, 2003).

2.2.6 Intercropping

Intercropping means growing two or more crops together on the same field (Gichuru et al, 2003). By combining crops that have different growth pattern, the available air, water and nutrients can be better utilized. Important goals of intercropping are: a direct production increase compared to monoculture due to better ground cover, optimum use of sunlight, more efficient root growth, extra nitrogen, spreading the risk of crop failure over more crops, due to multiple crops (i.e. if one crop fails the other might still yield something), limited effect of diseases and pests because one pest or disease is mostly specialized on one crop and will leave a different crop unharmed (Ndobe, 2013).

2.2.7 Use of cover crops

According to the United States Department of Agronomy Technical Notes Nº 56 of October 2010 (USDA/TN Agronomy Nº 56), a cover crop is a crop that is not harvested or generally grazed but is grown to benefit the soil health and/or future crops in numerous ways. Cover crops:

- Reduce wind and water erosion
- Sequester carbon in plant biomass and soils to increase soil organic matter content
- Capture and recycle excess nutrients in the soil profile

- Promote biological nitrogen fixation
- Suppress weeds and other pests
- Improve soil moisture management
- Provide supplemental forage
- Minimize and reduce soil compaction
- Improve soil tilth.

2.2.8 The practice of shifting cultivation

Shifting cultivation, also known as **slash and burn agriculture**, is an agricultural system that involves clearing a section of land and using it for farming activities for a relatively short time before abandoning it. Farmers then typically shift their agricultural operations to a new section of freshly cleared land.

The primary disadvantage of shifting cultivation, also called slash and burn or swidden agriculture, is the destruction of large areas of land, primarily crop fields and tracts of forest**.** When performed improperly, slash and burn can make once-fertile lands unable to support the new growth of crops and plants. Slash and burn may cause environmental and economic consequences by reducing the growth potential for crops in certain areas, which limits the variety and quantity of agricultural goods farmers can produce.

The quality and diversity of products harvested from swidden plots is usually higher compared to other types of farming. Also called swidden farming or slash and burn agriculture, shifting cultivation is a traditional method of farming that involves using a land then abandoning in later to allow the regeneration of fertility. This method of farming is common in Indonesia, Amazon rainforest and Central and West Africa.

2.3 Gaps identified in the literature and how the work shall attempt to fill them

The above literature explains and shows the emergency of the problem. The actual farming practices are not suitable to bring solutions to the problem and more, the partial

utilization of the Buea Lysoka prison farm land can also be pointed as one of the prevailing problems causing food insufficiency in the BCP.

So, ensuring the experimentation and implementation of new farming practices and, completely exploiting the 36ha Lysoka prison farm area, not leaving aside the sustainable land management of this farm land will, for sure propose strong solutions for this food issue and food security into this BCP.

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This above titled chapter begins with a description of the study area, followed by a description of the sources of data as well as the methods used to collect the data, and then the methods used for data analysis and presentation.

3.2 Description of the study area

The spatial matrix of the study area is Buea Subdivision, located between 4^{o} 3^{1} and 4^{o} 12N and 9^{o} 9^{1} and 9^{o} 2^{o}E (Ndobe, 2013). Buea was capital of the former West Cameroon and is presently the regional headquarter of the South-West Region. It is situated precisely at the foot of Mount Cameroon, which is the highest peak in west and central Africa with an altitude of about 4100 meters above sea level. There are a number of small villages, some of which include: Dibanda, Bolifamba, Muea, **Lysoka**, Bokova, Bwiteva, Bwitingi, Koke, Upper Farms, Sasse, and Tole amongst others. Given the mountainous location, Buea enjoys a cool climate, conducive for human habitation and performance of human and economic activities such as agriculture.

This belt is characterized by warm temperature (~23^{o}C) evenly distributed throughout the year, high relative humidity (76-90%), deep fertile soils with pockets of ferruginous and very fertile volcanic soils, and rather high annual rainfall (>2500mm) spread out in two distinct rainy and dry seasons. (Ehabe et al, 2001). The area is also characterized by several farm types (Ndobe, 2013), ranging from small-scale farm holding with mostly food crops (banana, plantain, cocoyam, cassava, yam, maize, etc.), industrial plantations for the production of export crops (tea, oil palm, hevea, cocoa, banana, etc.), and intercropped farm having various combinations of perennial and food crops (Ehabe et al, 2010).

Buea subdivision falls within the tropical climate but its various climatic elements of principally temperature and rainfall differ from that of the surrounding regions. This is greatly influenced by relief. Mount Cameroon has a strong influence on the Buea climate, causing a considerable orographic rainfall especially in the windward south. It is accessible through tarred and untarred roads.

3.3 Sources of data

The data used in the study were collected from two sources; primary and secondary sources.

3.3.1 Primary sources

The primary sources of data were field study (collection of information on farm practices that enhance land utilization thereby improving or reducing food production for the BCP inmates, field observation and interpretation of the relevance, interviews of the 67 prison staff). The interview guide sourced information of preparation plans on where to farm, how to farm, when to farm, what to farm and, what inputs are needed.

3.3.2 Secondary sources

The secondary sources used in this work include: textbooks, journals, articles, reports and dissertations/thesis and desktop survey of materials.

3.4 Data analysis

Data was analyzed using descriptive statistics and narration with the help of Microsoft Excel 2013 and SPSS Statistical Package 20.0.

CHAPTER FOUR
PRESENTATION AND ANALYSIS OF DATA

This chapter presents the results obtained from the study and discusses the results presented. In light of the interpretation, the chapter then discusses the various soil management practices and the extent to which these can contribute to farming production to enhance food security and improve on the livelihood of the Buea Central Prison inmates.

4.1 Result of objective 1

Table 4.1: Demographic information on prison inmates of Buea Central prison (that are food insecured).

Identification	Number	%
Minors	17	02,39
Males	685	96,34
Females	09	01,27
Total	711	100

The results show that there are 711 inmates in the Buea Central Prison. These inmates receive less than the required quantity of food each day, notably one unbalanced meal a day, with a state budget of CFAF 98 per inmate for feeding (MINJUSTICE, 2013). According to the Primary Ciliary Dyskinesia Foundation (2011), an average individual is supposed to afford a balanced diet of at least three square meals a day in other to maintain a good health and, energy needed to carry out all his daily activities. Eating well is key to maintaining strength, energy, a healthy immune system and general lung heath. The key to a healthy balanced diet is not to ban or omit any foods or food groups but to balance what you eat by consuming a variety of foods in the right proportions. At a high level, the basic elements of a healthy diet include the right amount of protein, fat, carbohydrates, vitamins, minerals and water.

Unfortunately, this is not the case of the Buea Central Prison. Therefore, 711 prison inmates are deeply food insecured. Of the 711 prison inmates, adult males (685) represent

96, 34%, and their contribution to prison labor is very high and therefore, the food they eat must supplement the daily lost energy.

Table 4.2: Buea Central Prison staff

Identification	Number	%
Senior staff	10	14,93
Junior staff	57	85,07
Total	67	100

Table 2 shows that, of the 67 staff members and prison security guards of the BCP who are one of the major stakeholders and, those that can actually instigate change in this penitentiary institution by advocating and negotiating for assistance and external partnership for the improvement of the living standards of the prison inmates, only 10 of them are decision makers, representing 14, 93% of the entire personnel and, 57 are under executing orders, with a percentage of 85, 07%. Land use planning is an integrated approach, but this is unfortunately not of utmost importance in the BCP.

4.1.1 Farming planning

Results from interview of stakeholders revealed that there is no pre-planning of what is to be cultivated in the prison farm. The prison staff just follow the general planting move of the area. When is time for planting maize, they do so, when people plant yams, they occupy part of the cultivated land area for themselves. Of the 67 staff of the Buea Central Prison interviewed, 83% say there is no pre-cultivation planning although they realized the importance of planning, while only 2% think there is planning and 15% do not even know if there is planning or not.

The following chart shows the farming planning rate with **83% No** (3), **2% Yes** (1) and **15% I don't know** (2).

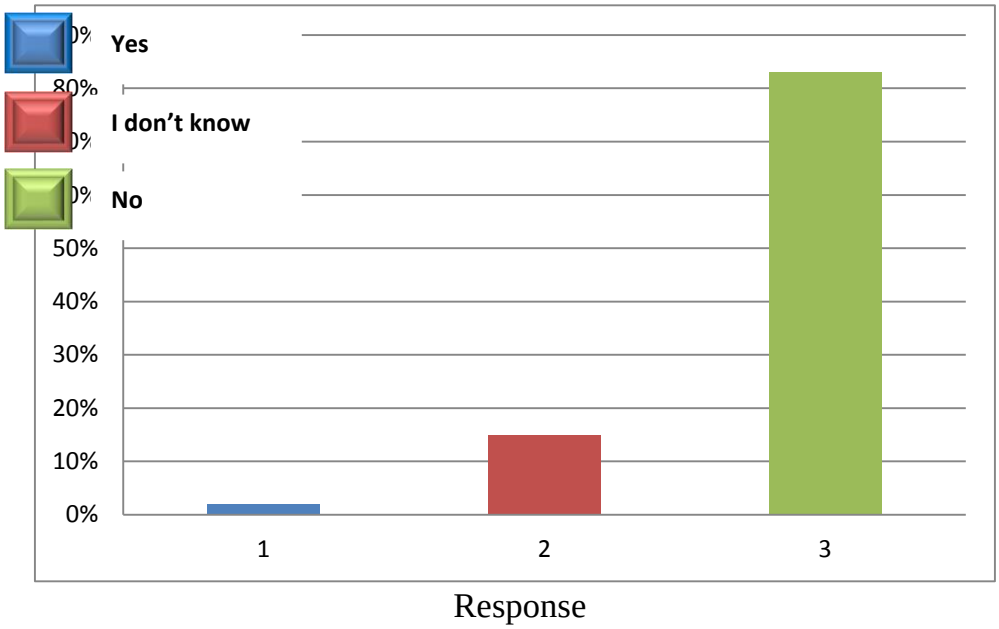

Figure 4.1: Assessment of crop cultivation planning in the BCP farm land area.

This absence of planning impacts on land management and directly influences crop yields and food security in the prison and, therefore, not compensating the inmates' endeavors and farming sacrifices.

4.2.1 Results of objective 2

From the study, of the 36 hectares of land owned by the Buea Central Prison, only about 09 hectares is used, giving 25% of the Buea Central Prison land utilization. This means that a majority of land owned by the prison is underutilized.

Results reveal that farming methods practiced on this farm land area include slash and burn, zero tillage and minimum tillage since the Buea Central Prison farm land is a rocky area. From our results, the most practiced farming method in this farm land area is slash and burn which is practiced on approximately 6 ha of the 9 ha utilized, giving a percentage of 16, 66% of the 36ha of the land, followed by zero tillage practiced on about

2 ha of the 9 ha, with a percentage of 5, 56% and, finally minimum tillage practiced on 1 ha, with a percentage of 2, 78% of the 25%.

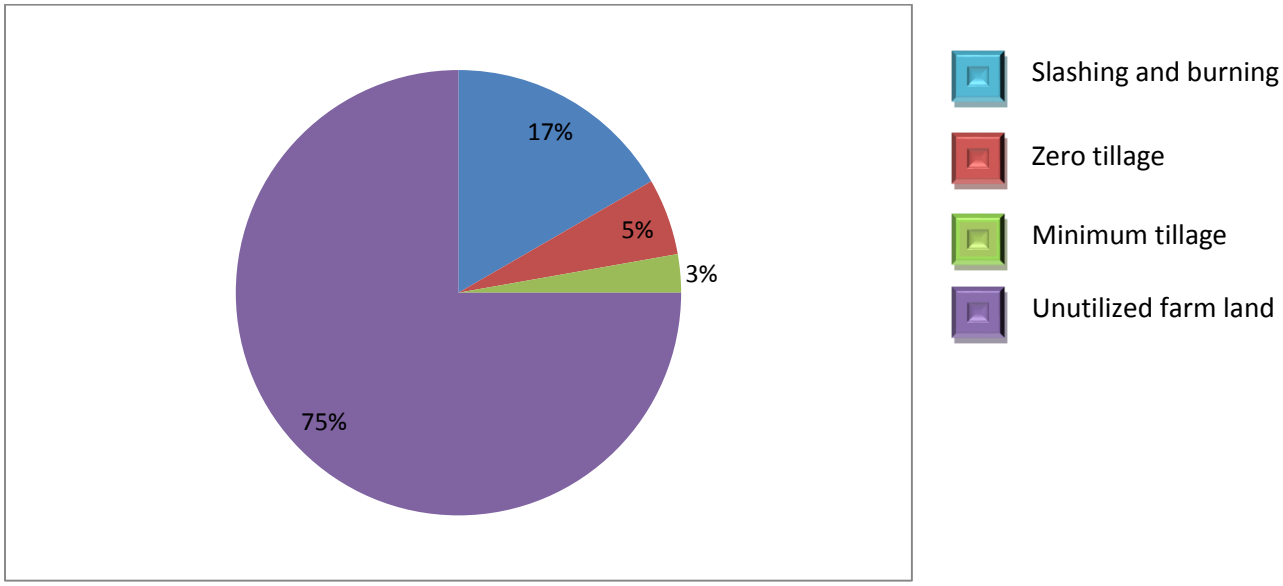

Figure 4.3: Rate of different farming practices and methods

4.2.2 Assessment of soil fertility management methods

Results show that 97% of the respondents interviewed had no idea about soil fertility management. They almost all answered they do nothing to manage soil fertility. Field visits revealed that grass cut by the prison inmates was burned systematically in hips or directly after been cleared (Figure 4.3).

Plate 4.1: Slash and burn. Though a poor practice, residues are gathered before burning.

Disadvantages to our environment are:

1- **Deforestation**: When practiced by large populations, when fields are not given sufficient time for vegetation to grow back, there is a temporary or permanent loss of forest cover.

2- **Erosion**: When fields are slashed, burned, and cultivated next to each other in rapid succession, roots and temporary water storages are lost and unable to prevent nutrients from leaving the area permanently.

3- **Nutrient Loss**: For the same reasons, fields may gradually lose the fertility they once had. The result may be desertification, a situation in which land is infertile and unable to support growth of any kind.

4- **Biodiversity Loss**: When plots of land area cleared, the various plants and animals that lived there are swept away (they disappear).

Benefits to farmers: Slash and burn agriculture has proven more sustainable and about as productive as more modern, energy-intensive agricultural methods. In contrast, modern mechanized agriculture often results in large areas planted in a mono crop and requires the removal of almost all trees. But in slash and burn agriculture same land can be used to grow multiple crops together. (www.eoearth.org/view/article/156045/)

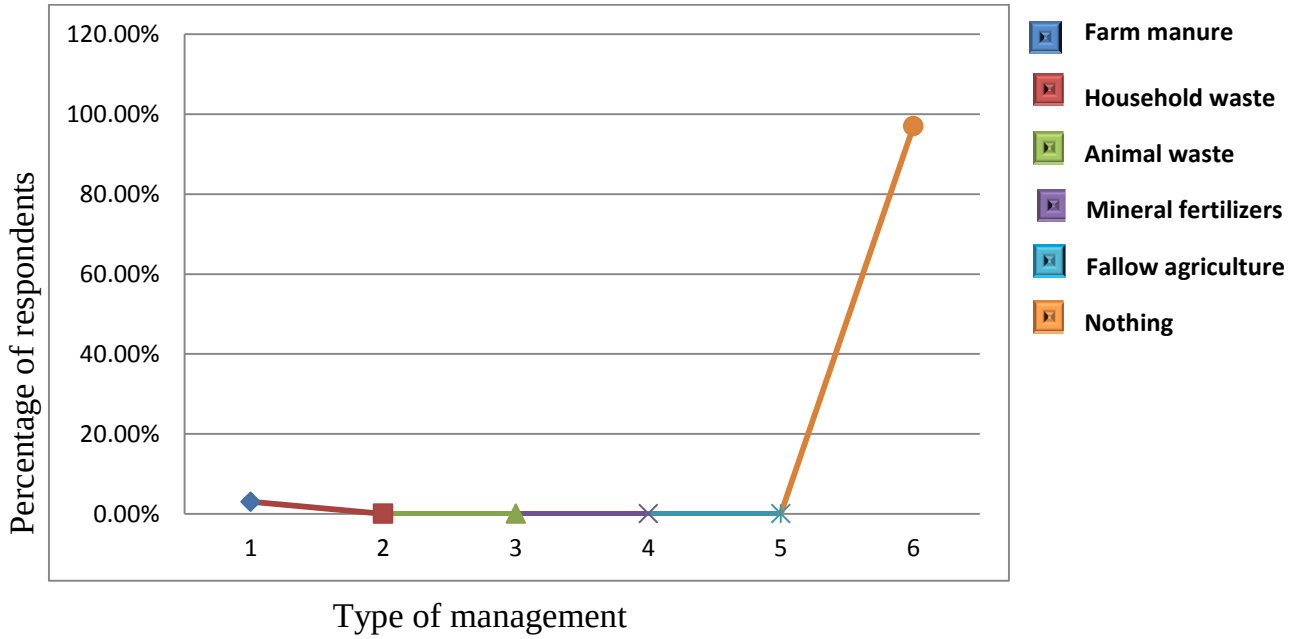

Figure 4.3: Management methods commonly practiced in the BCP farm land.

From Figure 4.3, 97% (6) of the respondents revealed that nothing was done to manage soil fertility and just 3% (1) said that farm manure was used for soil fertility management. There was no use of household waste (2), animal waste (3), mineral fertilizers (4) and fallow agriculture (5) as they all rated 0, 00% as the land area was formerly used for sugar cane cultivation by the villagers. This is why the administration had to plant a sign board (plate 4.2 and 3) to stop villagers from trespassing.

Plate 4.2: Occupation of uncultivated prison farm land area by locals

Plate 4.3: Government's sign board to stop villagers from trespassing.

4.4 Contribution of farming practices and soil fertility management to food production

Results show that the poor practice of fertility management methods has affected soil fertility and decreased crop productivity over the years. The practicing of methods like systematic burning of farm manure and crop residues has greatly impacted on agricultural output and has help in maintaining food insecurity in the Buea Central Prison. The sum of the BCP farm annual outputs for different crops cultivated on the 09 hectares used is presented in table 4.3 below for the year -2014

Table 4.3: Annual output for different crops cultivated in the BCP farm land area.

Crop	Output per harvest
Maize	05 tons
Cassava	04 tons
Yams	03 tons

Results show that 96, 78 % of the Buea Central Prison is not satisfied with the output they get from the various farming methods practiced and 3, 22% are undecided.

4.5 Limitations of the study

Firstly, there were insufficient funds to carry out the series of activities to cover other prison farm lands not only of the study area, but also of the South-West region. Secondly, the poor commitment and participation of the major stakeholders to provide relevant information without financial motivation and fear was a serious limitation to the quality of results obtained. To solve this, we had to explain to respondents that the study was being carried for academic purpose and that findings would help rehearse the various farm management practices in the Buea prison farm land and eventually improve the prison farm land output, the living conditions of inmate and enhance food security and capacity building into the Buea Central Prison.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The ideal would be that the basic needs of inmates are satisfied for a better enhancement of every activities geared towards preparing the prison inmates for their social re-insertion and social acceptance into the society.

This study has helped assess the various farm management practices on the Buea prison farm land and their implication to food production and food security in the above mentioned prison.

The results revelations are clearly showing that the poor food production and food insecurity in the Buea Central Prison is directly linked to the various farm management practices in the Buea prison farm land.

The implications are numerous and their impacts are real in every daily life activities of the Buea Central Prison and eventually in the wellbeing and effective and efficient social rehabilitation of its inmates.

The results of objective 1 showed that must of the stakeholders are not informed. They do not have planning as their major concern. They do not take views of the locals on how to do the work. The major stakeholders do not communicate. There is lack of concertation amongst themselves and opening for external technical expertise. They do not carry out land suitability assessment and no land evaluation.

The results of objective 2 identified that most farm practices in the area are neither concerted nor sustainable with complete lack of application of fertilizers.

5.2 Conclusion

It can be concluded that the different farm management practices on prison farms have an impact on food production. These have contributed plausibly to poorer agricultural production, creating imbalance and failing to meet the increasing population food demand of prison inmates and, prisons' income, prisoners' livelihoods and development in the penitentiary milieu.

5.2. Recommendations

Based on findings, the following recommendations have been made in order to better manage the prisons' farms;

A) Staff members in-charge of decision making should:

1. Engage more in multiple cropping knowing that one crop could serve as support for another crop or even may also serve as nutrients for another crop. A good example of such cropping is the cultivation of maize and beans on the same piece of land.
2. Use the entire prison farm land and, practice shifting cultivation and let the land fallow for a period of about seven years in order to let the soil regain its natural fertility and also regain he natural nutrients needed for growing crops.
3. Reasonable application of chemical fertilizers should be used in cases where there is need though, integrated with other OF (Organic Fertilizers).
4. Application of organic crop residues eliminate empty soils, preventing the soil from direct rain drop impacts, direct sun rays, maintaining a normal soil temperature for microbial activities and hence, prevent soil erosion.
5. Open the prison to external partnership without compromising security imperatives.

B) External partners should:

1. Be open and flexible to cooperate and partner with the penitentiary authorities in other to foster development in the prison milieu.

2. Specialized agencies and institutions, development actors, INGOs, NGO etc. should contribute with their technical expertise for a sustainable preparation of the social rehabilitation of prison inmates by not only investing in prison entrepreneurial skills, but also ensuring that prisoners' basic and fundamental needs are satisfied.

C) Inmates are the center of every endeavor and, the first beneficiaries. They should therefore:

1. Cooperate both with the staff members and any other partner for an effective and efficient implementation of all the programs and activities that will improve on their livelihood, food security, development and capacity building.

CHAPITRE 5 :

CONCLUSIONS ET RECOMMANDATIONS

5.1 Synthèse des Résultats

L'idéal serait que les besoins fondamentaux des détenus sont satisfaits pour une meilleure mise en œuvre de toutes les activités visant à les préparer à leur réinsertion et à l'acceptation sociale.

Cette étude a permis d'évaluer les diverses pratiques de gestion agricole sur les champs pénitentiaires de Buea et leur impacts sur la production et la sécurité alimentaire dans la prison centrale de Buéa.

Les révélations des résultats montrent clairement que l'insuffisante et la pauvre production ainsi que l'insécurité alimentaire dans la prison centrale de Buea est directement liée aux différentes pratiques de gestion agricole dans les terres agricoles de ladite prison.

Les implications sont nombreuses et leurs impacts sont réels dans toutes les activités de la vie quotidienne de ce pénitencier et éventuellement dans le bien-être et la santé de ses détenus voir même dans l'efficacité et l'efficience des activités de réinsertion sociale.

Les résultats de l'objectif de recherche n°1 ont identifiés que la plupart des pratiques agricoles ne sont ni concertée, ni durable avec l'absence totale de l'application d'engrais.

Les résultats de l'objectif de recherche n°2 ont montré que les principales parties prenantes ne sont pas informées. La planification n'est pas leur préoccupation majeure. Ils ne prennent pas les vues de la population locale sur la façon de faire le travail. Les principales parties prenantes ne communiquent pas assez. Il y a un manque de concertation entre eux et l'ouverture à l'expertise technique externe. Ils ne procèdent pas à l'évaluation des terres.

5.2 Conclusion

Il peut être conclu que les différentes pratiques de gestion agricole sur les champs pénitentiaires ont un impact sur la production et la sécurité alimentaire. Celles-ci ont contribué de manière plausible à la détérioration de la production agricole, à créer un déséquilibre et à ne pas répondre à la demande croissante de la population carcérale en besoins alimentaires.

5.2. Recommandations

Basé sur les conclusions, les recommandations suivantes ont été formulées pour une meilleure gestion des champs pénitentiaires.

A) Le personnel en charge de la prise de décisions devrait:

1. Engager plus en polyculture sachant qu'une culture pourrait servir de support à une autre culture ou même pourrait également servir de nutriments à une autre culture. Un bon exemple de cette culture est la culture du maïs et des haricots sur le même lopin de terre.

2. Utilisez l'ensemble des terres agricoles de la prison et, pratiquer la culture itinérante et laisser la terre en jachère pendant une période d'environ sept ans, afin de permettre au sol de retrouver sa fertilité naturelle et aussi recouvrir ses nutriments naturels nécessaires à la croissance des cultures.

3. Procéder à l'application raisonnable d'engrais chimiques en cas de nécessité et, cependant, avec l'association des engrais organiques.

4. L'application des résidus de cultures organiques élimine les sols vides, Protégeant le sol des impacts de gouttes de pluie directe, les rayons du soleil directs, le maintien d'une température normale du sol pour les activités microbiennes et donc, de prévenir l'érosion des sols.

5. Ouvrir la prison au partenariat et à l'expertise technique externe sans compromettre les impératifs de sécurité.

B) Les partenaires extérieurs devraient:

1. Etre ouvert et flexible pour coopérer et collaborer avec les autorités pénitentiaires pour favoriser le développement dans le milieu carcéral.

2. Les institutions et les agences spécialisées, les acteurs du développement, les OING, les ONG, etc., devraient contribuer avec leur expertise technique pour une préparation durable de la réinsertion sociale des détenus, non seulement en investissant dans les compétences entrepreneuriales en milieu carcérale, mais aussi veiller à ce que les Droits Humains «de base et fondamental à la santé et à l'alimentation soient satisfaits ».

C) Les détenus sont au centre de tous les efforts et les premiers bénéficiaires. Ils devraient donc:

1. Coopérer à la fois avec les membres du personnel d'encadrement et tout autre partenaire pour une mise en œuvre effective et efficace de tous les programmes et activités qui permettront d'améliorer leur subsistance, la sécurité alimentaire, le développement et le renforcement des capacités.

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APPENDIXES

Appendix 1: List of tables.

Appendix 2: List of figures.

Appendix 3: List of plates.

Appendix 4: Interview guide

I am Wolani Shudzeka Etiene, a student of the Pan African Institute For Development-West Africa (PAID-WA) – Buea, carrying out research on the topic ***"An Assessment of the Farm Management Practices on Prison Farms and the Implication on Food Production: Case study Lysoka"*.** This work is strictly for academic purpose in which it has been designed.

We will be grateful for your sincere collaboration.

1. Respondent status: ☐ staff member? ☐ Inmate?
2. Do you carry out farm planning before starting any farming activity on the prison farm?
3. Do you cooperate with external bodies to improve on the prison farm productivity? If yes, which? If no, why?
4. Do you intend to do so in the future?
5. Land Management and Farming Practices.
   - 5.1. What is the main crop on the prison farm?
   - 5.2. Other associated food crops?
   - 5.3. How do you manage soil fertility in the prison farm? ☐ Farm manure? ☐ Mineral fertilizers? ☐ Fallow? ☐ Prison waste? ☐ Animal waste? ☐ Compost? ☐ Others? (specify) ☐ Nothing?
   - 5.4. Do you intend to use fertilizers in the future?
   - 5.5. What farming methods do you practice on the prison farm? Hoeing? ☐ Zero tillage? ☐ Slash and spray? ☐ Slash and burn? ☐ Crop rotation? ☐ Shifting cultivation? ☐ Others? (specify) ☐
   - 5.6. Do you intend to be planting other crops in the dry season to keep the soil covered?

5.7. Do you know it is not good to burn crop residues?

6. Productivity and output.

6.1. How do you appreciate your output of last season? Low? Average? Good? Very good? Bad? Very bad?

6.2. Is this output satisfactory?

6.3. Would you consider receiving external technical expertise?