CONTRIBUTION OF NATIONAL SERVICE ON AGRICULTURAL PRODUCTION: A CASE OF MAIZE PRODUCTION BY MGAMBO JKT IN HANDENI DISTRICT

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN RURAL DEVEOPMENT OF SOKOINE UNIVERSITY OF AGRICULTURE.

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ABSTRACT

The role of National Service in promoting agricultural development and its influence on agricultural production in rural communities has received little attention on the discussion of civil-military relations despite the existing nexus of military and agricultural development. This study examined contribution of National Service in agricultural production and used maize production by Mgambo JKT in Handeni District as the case study. Purposively, maize farmers near and far from Mgambo JKT were chosen in order to assess spill over effects of Mgambo JKT on surrounding villages. Assessment on agricultural production by Mgambo JKT revealed that the camp has been increasing her capacity in maize seeds multiplication for hybrid varieties such as TMV-1and TAN-250. Contribution of Mgambo JKT in the total maize production in Handeni District has increased from 0.2% in 2008 to 0.7% in 2011. On the other hand, spillover effects of Mgambo JKT were considered as an impact contribution of National Service camps in agricultural production of rural areas. One of the more significant findings from this study was that farmers near Mgambo JKT viewed the presence of Mgambo JKT maize farms in their area as a demonstration. In return some farmers have imitated conventional practices of Mgambo JKT such as proper spacing, row planting and use of improved seeds. Mean maize productivity of farmers nearby the camp was higher than of those far from the camp. Generally, National Service as a stakeholder in rural agricultural production has an impact on surrounding communities that is limited to spill over effects produced by the National Service camps. In order to fill the gap and to support government efforts in improving agricultural production in rural areas, National Service camps should establish outreach programs aiming at improvement of agricultural production of surrounding communities and rural agricultural development as a whole.

DECLARATION

I, George Jeremia Mbiligenda, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

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DEDICATION

I would like to dedicate this dissertation to young scholars of civil-military relations in Tanzania. It is my auspicious hope to say this dissertation will help to unravel and improve awareness on civil-military relations with respect to the contribution of military in agricultural production in rural areas.

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LIST OF ABBREVIATIONS AND SYMBOLS

ASA	Agricultural Seed Agency
ASDP	Agricultural Sector Development Programme
GDP	Gross Domestic Product
JKT	Jeshi la Kujenga Taifa
MAFC	Ministry of Agriculture Food Security and Cooperatives
NSGRP	National Strategy for Growth and Reduction of Poverty
TAN-SEED	Tanzania Seed Company
TPDF	Tanzania Peoples Defence Force
URT	United Republic of Tanzania

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Many countries in the world have established National Service for their citizens mainly the youth to serve their societies. National Service programmes have potential to forge a new sense of national community, rebuild the connection between the rights and responsibilities of citizenship and re-establish a sound civil military relationship (Grigsby, 2008).

National Service programmes are divided into two major arrangements, namely volunteer and compulsory schemes normally specified by the National Service or Military Act of a given country. Examples of a few countries with National Service in form of civilian service are United States of America and Nigeria. On the other hand, countries with National Services in form of military service or Conscription are; Greece, Norway, Russia, Israel, Singapore, China, Republic of Korea, Iran, Sudan, Egypt, Libya, Guinea and Tunisia (Bret, 2006).

Tanzania National Service (JKT) is one among four commands of Tanzania People's Defence Force (TPDF). The need to establish National Service in Tanzania was pioneered by TANU Youth League whereby it was launched on 10th July 1963. Later on National Service in Tanzania was legally established under National Service Act of 1964 (URT, 1964). In 1975 National Service was amalgamated with TPDF. However unlike the other commands of TPDF, the main objective of Tanzania National Service is to build and prepare the youths to serve the nation (URT, 1964). Other objectives of the National Service are to train the young citizens to serve the nation in the spheres of social and

economic development alongside the function of upbringing youths in defence of the country (URT, 1975).

Agriculture sector is considered to be a major economic activity in Tanzania. About 74 percent of the Tanzanian population mostly living in rural areas are engaged in agricultural production (Mnenwa and Maliti, 2010). Performance of agriculture sector in the share of GDP was recorded to be 24.6 percent under which the growth of crop subsector was recorded to grow by 3.4 percent in 2009 (URT, 2010).

In Tanga Region, agriculture is the main economic activity under which major food crop grown is maize occupying a total of 315 882 hectares out of 436 725 hectares planted with annual crops and vegetables in the region. Handeni District is estimated to have the largest area planted with maize occupying a total area of 79 794 hectares followed by Kilindi 55 896 hectares and Korogwe 54 273 hectares while other districts each had less than 50 000 hectares (URT, 2012).

National Service is emerging to be one among important stakeholders for agricultural development in Tanzania. However, this important stakeholder has not been taken into account in respect of its contribution in the past and existing analyses on the roles of stakeholders in agricultural development in Tanzania. The aim of this study is, therefore, to show the contribution of National Service in agricultural production and to assess the spillover effects of National Service camps on agricultural production to the surrounding villages. Maize production by Mgambo JKT was used as the case study.

1.2 Problem Statement

Tanzania National Service is one of the stakeholders in national development which creates a common ground for civil-military relations which in return provides a nexus of military and national development. Military-development nexus in Tanzania invites the necessity of the government, military and the citizenry to meet and pursue a common goal to realize development of several sectors such as agriculture.

Although military-development nexus is an important aspect of civil-military relations, most of previous studies on civil-military relations were centred on the issue of political environment surrounding the state and its military. Nielsen (2008) argues that the development of theory to guide the study of civil-military relations has focused heavily on the issue of civilian control. In the light of above argument, such a stance should not be the overall area of concentration in the study of civil-military relations due to the fact that civil-military relations are not only dependent on political environment but also are subject to socio-economic environment surrounding the military and its society.

In Tanzania, the trend of discussions on civil-military relations as an academia has approached the theme of military and its society in a stance of civil-military theory confined within the environment of political development surrounding the government and military. This claim is evidenced by the existing literature of civil-military relations with themes such as; Civil-military relations and political stability (Lupogo, 2001; Omari, 2002); Historical perspective of civil-military relations (Luanda, 2005); Control of defence and security sector (Baregu, 2004; Mahanga, 2005); Security and democracy (Maundi, 2007); Security sector reform (Rupiya, 2005); Perception of civil-security relations (Kilaini, 2005) and lastly but not least is comparative analysis of civil-military

relations between Tanzania and other countries such as Nigeria and Zambia (Hoel, 2008; Lindemann, 2010).

Little, if any has been explored on non-military and non-political roles of Tanzanian military in the development of its society especially at the grassroots level in rural areas. One of the areas wherein the National Service role has not been explored in military-development nexus is on its contribution to agricultural production. Hence this study aimed to assess contribution of National Service in agricultural production and used maize production by Mgambo JKT in Handeni District as a case.

1.3 Justification of the Study

Research findings provide a feedback to National Service imperatives as inputs for improving their contribution on agricultural development so as to enhance the degree of achieving goals of Kilimo Kwanza, ASDP and National Strategy for Growth and Reduction of Poverty (NSGRP).

On the other hand, the study unravels and improves awareness on civil-military relations through establishing the contribution of National Service in agricultural production. The study was intended to improve awareness on civil-military relations with respect to National Service involvement in agricultural production. The snap shot generated provides a picture on how National service camps are engaged in agricultural production and how far their spillover effects have influenced change in agricultural productivity among farmers of rural areas.

1.4 Research Objectives

1.4.1 Main objective

The main objective of this study was to assess contribution of Mgambo JKT on agricultural production in Handeni District.

1.4.2 Specific objectives

Specifically, the study:

i. determined maize production by Mgambo JKT;
ii. estimated the proportion of maize production by Mgambo JKT in overall Handeni District maize production;
iii. assessed the spill over effects related to maize production of Mgambo JKT to the surrounding villages; and
iv. compared maize productivity between farmers near and far from the Mgambo JKT.

1.5 Hypothesis

H_1: Maize productivity differs significantly between farmers near and far from Mgambo JKT.

1.6 Conceptual Framework

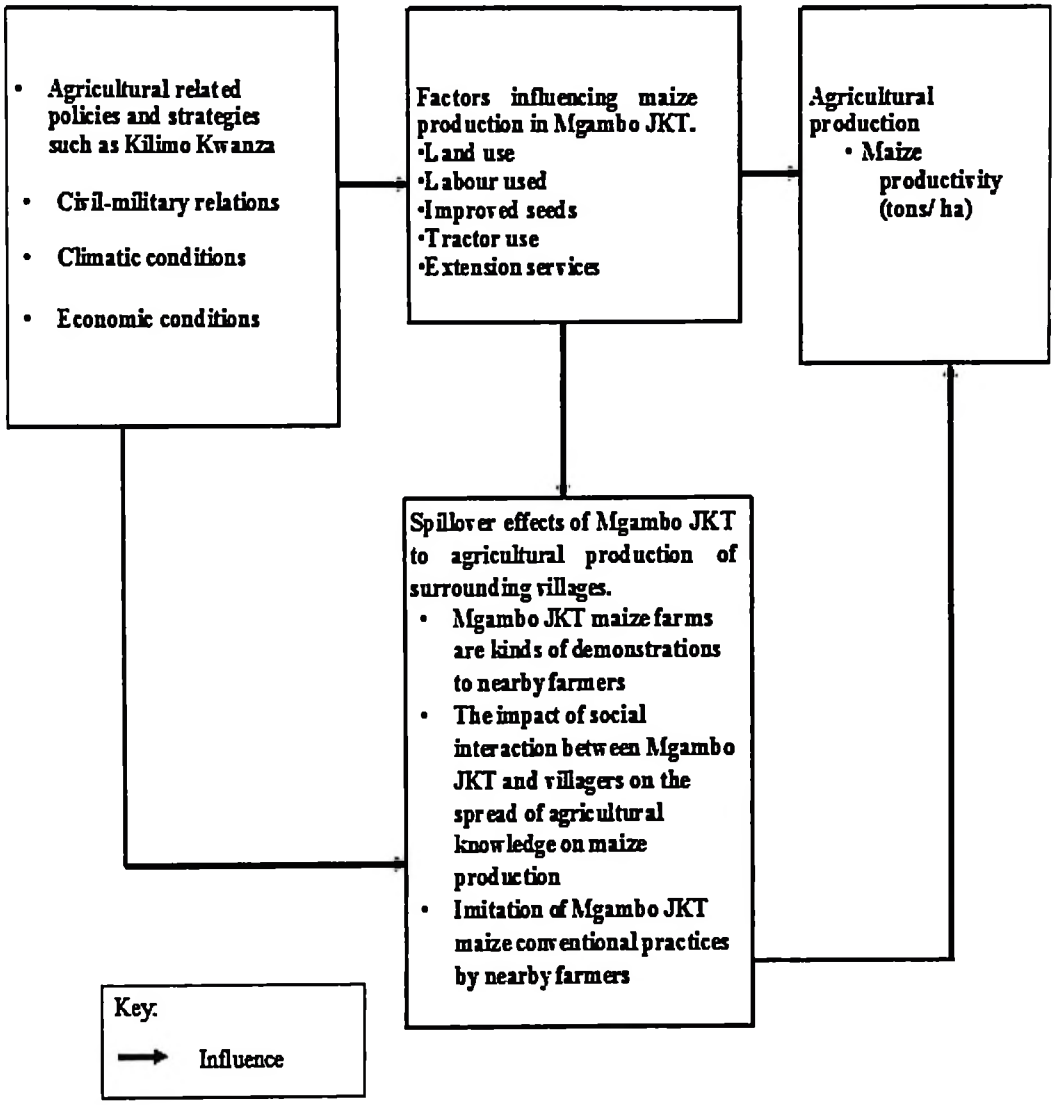
The main concept of the study was deduced from concordance theory and citizen- soldiers conception. Concordance theory suggests a close relationship between the military, political elites and the citizenry aiming at shared values and objectives. The citizen-soldiers conception in the idea of a professional soldier advocates soldiers to participate in public life for the good of the community because military as an institution is a part of society. Under the umbrella of military–development nexus with a focus on agricultural

development, Tanzanian government through policies and strategies such as Kilimo Kwanza has an influence on National Service to produce for the interests of the state and its people. National Service through presidential order of 2008 is considered by the government to be an engine of implementing Kilimo Kwanza in the process of realizing agricultural development.

Agricultural production with a focus on maize by Mgambo JKT and villages near and far from Mgambo JKT was viewed as a dependent variable affected by different factors of production as shown in (Fig. 1). On the other hand, National Service camps are not living in isolation but they live and interact with the society. Being the government and people's institution, National Service has a call to influence some changes and modernize the society. Under such environment it was assumed that Mgambo JKT has spillover effects on agricultural production of the surrounding villages. By holding other factors constant, it was assumed that villages nearby Mgambo JKT have the higher maize productivity in terms of yield per area (tonnes per hectare) than villages far from the camp. Also it was assumed that villages near Mgambo JKT were at the advantage of the spillover effects from the camp as they are near to the focal point. On the other hand villages far from Mgambo JKT were assumed to have no advantage of the spill over effects from the camp as they are far from the focal point.

Selected area for assessing the spillover effects of Mgambo JKT to the maize farmers of surrounding villages firstly, was on how Mgambo JKT maize farms provide a kind demonstration to farmers nearby the camp which in return provide villagers with an opportunity to observe improved farming practices from the camp. Secondly, was on how social interaction among villagers and Mgambo JKT workers, servicemen and women enhanced the flow of agricultural knowledge from Mgambo JKT to the maize farmers of

surrounding villages and, lastly, was on whether the surrounding villages have imitated any maize conventional practices from Mgambo JKT. By holding other factors constant, it was assumed that spillover effects from Mgambo JKT to the surrounding villages has influence on maize productivity on the side of maize farmers nearby the camp. Hence it was hypothesized that maize productivity differed significantly between farmers near and far from the Mgambo JKT.



Source: Own construct

Figure 1: Civil-military relations and maize production by Mgambo JKT and surrounding villages

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Maize Production and Productivity among Farmers

This section highlights maize productivity at international, national and regional levels in order to explore the performance of maize production and challenges facing maize farmers.

2.1.1 Maize production in Sub-Saharan Africa

Maize is an important food crop in Sub-Saharan Africa which accounts for 15.7 % of global land planted with maize. The major maize growing countries are Nigeria, South Africa, Ethiopia, Kenya, Malawi, Tanzania, Congo, Mozambique, and Zimbabwe. Despite of having a large area planted with maize, Sub-Saharan Africa has only 7% of the world's 600 million tons of production (M'mboyi *et al.*, 2010).

Sub-Saharan regional average maize yields are 1.7 tonnes per hectare in West Africa, 1.5 tonnes per hectare in East Africa and 1.1 tonnes per hectare in Southern Africa (M'mboyi *et al.*, 2010). In addition to that, the analysis of food crops productivity shows that there is similarity in the agricultural productivity in Sub-Saharan Africa (URT, 2008). In comparison to other regions in the world, sub-Saharan Africa has an average productivity of 1.3 tonnes per hectare while industrialized countries have the highest average productivity of 8 tonnes per hectare. Other average maize productivity were estimated at 3.8 tonnes per hectare in Brazil, 3.1 tonnes per hectare in Mexico, 2.5 tonnes per hectare in the Philippines and 3.9 tonnes per hectare in Thailand (M'mboyi *et al.*, 2010; Smale *et al.*, 2011).

The gap in maize productivity between Africa and other parts of world is due to different factors such as disparities in climatic conditions such as tropical versus temperate and in farming technologies (M'mboyi *et al.*, 2010). Maize farming practices on industrialized world employs intensive use inputs and highly mechanized mono crop production systems using hybrid maize varieties. In sub-Saharan Africa maize is grown by small-scale farmers, producing for subsistence under which the system is associated with challenges such as; lack inputs such as fertilizer, improved seed and irrigation. In addition to that maize farming Sub-Saharan Africa is faced with risks such as erratic weather conditions, poor soils, pests, diseases, poor markets and rural infrastructure (M'mboyi *et al.*, 2010).

2.1.2 Maize production in Tanzania

Maize is an important food crop that is grown in all regions of Tanzania occupying an average of two million hectares which is estimated to be about 45% of the cultivated area. In Tanzania, most of the maize is produced in the Southern Highlands that accounts for 46% of total production. Other regions that have more productivity are the Lake zone and the Northern zone. On the other hand Dar-es-Salaam, Lindi, Singida, Coast, and Kigoma are maize-deficit regions (Kaliba *et al.*, 1998).

In Tanzania maize production is dominated by Smallholder farmers with up to 10 hectares of farm land per household who account for about 85% of the maize produced. Maize farming system is characterized by low use of improved technologies such as fertilizers, seeds and crop husbandry practices which result into low yields and slow growth in productivity. On the other hand maize production is affected by erratic rainfall whereby maize yield pattern reflects production which is highly correlated to rainfall factor (Mwakalinga and Massawe, 2007). National level average yields are less than 1.5 tonnes

per hectare. In connection to that there is a regional diversity which is higher in high-potential areas such as in the southern highlands with regions such as Rukwa, Mbeya and Iringa as compared to East and central Zones which include regions such as Tanga, Coast, Dar-es-salaam, Morogoro, Singida and Dodoma. The performance of maize productivity in Dodoma and Singida is low at 0.4 tonnes per hectare which is below the national average yield of 1 tonne per hectare (Temu *et al.*, 2011).

2.1.3 Maize production in Eastern Tanzania

Maize is an important food and cash crop in the Eastern Zone and accounts for 9% of total national maize production and 14.5% of national maize area. Average yields in Eastern Zone remain low at about 1.5 tonnes per hectare. Most of the maize is produced in Tanga (40%) and Morogoro (55%) while the other 5% is grown in the Coast and Dar-es-Salaam regions (Kaliba *et al.*, 1998).

2.2 Definition of Key Terms

2.2.1 Agricultural production

Agricultural production in this study refers to growing and harvesting of different types of crops. It also includes keeping of livestock and poultry (URT, 2011b). However, in this study agricultural production is narrowed to capture the production activities of the crop sub-sector such as maize production.

2.2.2 Spillover effect

According to Cambridge dictionary spillover effect refers to the effects of an activity spreading further than it was originary indented. According to Deb and Bantilan (2001), a technological breakthrough in agriculture often leads to increased yields, or improves the quality of output, or enhances the efficiency of input use. If a new technology has

applicability beyond the location or commodity for which it was generated, such an effect is commonly referred to as a spillover effect.

The external effect generated by the spillover that relates to this study is referred to as across-location or across-environment spillover effect. According to Deb and Bantilan (2001), across-location spill over effect refers to a situation in which a technology developed for a particular crop at a specific location can be adapted to improve the production efficiency of that crop at other locations. However, the degree of applicability may vary across locations due to agronomic, climatic and ecological differences in the production environments.

2.2.3 Civil-military relations

Civil-military relations refer to the web of relations between the military and the society within which it operates, and of which it is necessarily a part. Such relations encompass all aspects of the role of the military as a professional, political, social and economic institution in the entire gambit of national life. Civil–military relations involve issues of the attitude of the military towards the civilian society, the civilian society's perception of, and attitudes towards the military, and the role of the armed forces in relation to the state (Ebo, 2005).

2.2.4 National service

National service means different things to different people and thus proposals for National Service establishment in different countries vary widely in terms of their political environment, objectives, intended participation levels and implications. Two elements common to most definitions of National Service, however, are the types of activities that would be considered public service and the notion of sacrifice on the part of

participants (Congressional Budget Office, 1990). In simple definition National service is a program intended to provide a shared experience for all citizens which builds and encourages a sense of national unity (Schoonover, 2008). It is important to note that the idea of service is shaped by the history and service traditions of a society, its level of development, the way in which it governs itself, organizes its economy, views the role of its citizens and its social institutions in meeting human needs and in promoting democracy (Patel, 2003).

2.3 Types of National Service

Compulsory and volunteer schemes are the types of National Service. National Service can take a form of civilian service or military service as specified by National Service or military act of a given country. Countries with operational civilian National Service without military conscription in the world includes; United States of America and Nigeria. United State of America was chosen as an example of a volunteer scheme in form of the civilian service. On the other hand Nigeria was chosen as an example of Compulsory scheme in form of the civilian service.

United States of America has a voluntary scheme called Corporation for National and Community Service which is divided into different programmes such as; AmeriCorps, Senior corps and Learn and Serve America so as to make citizens of all ages to serve their communities through service (Corporation for National and Community Service, 2006).

Nigeria has the National Youth Service Corps as a compulsory National Service program intended for youth graduates from universities to serve in the development of the country through service-learning (Obadare, 2005). Federal Republic of Nigeria (1993) outlines the purpose of the scheme in objectives such inculcating in Nigerian Youths the spirit of

selfless service to the community, emphasizing the spirit of oneness and brotherhood of all Nigerians irrespective of cultural or social background. Another objective is to enable Nigerian youths to acquire the spirit of self-reliance by encouraging them to develop skills for self-employment and to contribute to the accelerated growth of the national economy. Last but not least objective of National Youth Service Corps is to develop in the Nigerian youths the attitudes of mind acquired through shared experience and suitable training which will make them more amenable to mobilization in the national interest.

On the other hand, to mention a few countries with compulsory National Services in form of military service or Conscripts in Europe includes; Russia, Greece, Norway and Poland. In Asia, countries with National Service in form of military service are; Singapore, China, Republic of Korea and Iran. Lastly countries with compulsory National Service in form of military service in Africa are; Sudan, Egypt, Libya, Ghana, Guinea, Zimbabwe and Tunisia (Bret, 2006).

2.4 Rationale of National Service

2.4.1 Output producing rationale

National Service has an output producing rationale which is the benefit to the society from the National Service participants and programmes. National Service can be used to fill the gaps through meeting the unmet or the pressing needs of society (Congressional Budget Office, 1990). National Service can be used to meet important national needs. National Service in Tanzania is engaged in different economic activities such as agriculture in order to support government efforts in national development.

2.4.2 Input-enhancing rationale

National Service has the input-enhancing rationale which is the benefits to participants themselves. Such benefits are socialization, increasing awareness of their society, building a sense of patriotism, reducing alienation, provision of education, building a spirit of self-reliance, working experience and reducing unemployment or idleness (Congressional Budget Office, 1990). National Service enables youth to be prepared for active citizenship in their future life. Participation in service programs empowers young people to become active citizens in addressing a wide range of critical community needs (Stroud *et al.*, 2005). National Service can be an effective youth intervention and development strategy to provide important returns to the individuals such as Service 'employment' experience, even if unpaid, allows young people to gain the knowledge and skills that will facilitate their transition into paid employment. Also National Service provides constructive alternatives to risky behaviour, and can provide a mechanism for reintegrating marginalized youth such as out-of-school and unemployed (Stroud *et al.*, 2005).

2.4.3 Civic obligation rationale

National Service enhances the civic obligation rationale whereby citizens have an obligation to the society due to the benefits society provides to them. In return the best time to pay back the debt is at youth age and the best place for that is through National Service (Congressional Budget Office, 1990). Civic republican conception of citizenship emphasizes on duties demanded from the citizen as the result of his or her citizenship in the state. People have rights to be citizens of a particular state but also they have a responsibility to serve their societies due to the fact that every right demands a responsibility (Obadare, 2005). Generally, Citizens have a responsibility to serve their

society whereby National Service is a place for service-citizenship nexus so as to exercise citizenship as a civic duty.

2.4.4 Social glue rationale

Schoonover (2008) argues that the more people can understand each other cultures, the more tolerant they will become as citizens of the differences that make them unique. National Service provides the social glue to unite the citizenry whereby mandatory national service is hypothesized to build a more balanced citizen by increasing community engagement, instilling a sense of responsibility, and promoting understanding among different communities.

2.4.5 Reducing civilian-military gap

National Service can be used to reduce civilian-military gap which is the perceived or real growing cultural divides between a civilian world that fails to understand the mission of the military and a military that scorns the values and priorities of civilian life. This is due to the fact that the civil and military cultures grow in a different way (Brown, 2006).

2.5 Challenges Associated with Implementation of National Service in different Countries

From a global perspective, one of the major challenges facing National Service in some countries is an inadequate political will, visionary leadership, legislative and policy direction to deal with national youth policy, national youth service and to mainstream them into national development plans. National youth services are not connected to the national youth policy. There is no strong coordination between national youth service and national youth policy so as to achieve maximum impact and benefit to young people and to the society in general. National youth policy in some countries are not sufficiently

cross-sectorial in concept and management as the result there is no involvement of inter-ministerial committees on youth, national youth councils and national youth service. In additional to that, the problem is that the people concerned with youth policy and those concerned with national youth service are often located in different government ministries and have quite different points of emphasis and reference. Therefore there is lack of strong partnerships between relevant youth organizations and government at national, provincial and local levels (Angel, 2003).

Reflecting from a global perspective on problems associated with implementation of National Service, the other major challenge facing National Service in some countries is the manipulation by governments for political purposes as the result of political mechanization. National Service may fall a victim of political mechanization and can be used by political elites in the name of state interests for political purposes (Angel, 2003).

Other challenges to mention a few are; low levels of funding that are not always sustained, insufficient training of personnel and capacity-building of youth, little space for a youth partnership, insufficient coverage and outreach and lack of time-bound action plans to implement both policy and service (Angel, 2003).

2.6 Historical Perspective of National Service in Tanzania

Tanzanian National Service is among the first institutions to be formed after Mainland Tanzania had got its national independence in 1961(URT, 2011a). History of National Service in implementing its vision, mission, and objectives is as old as the history of the nation and has survived different political environment such as socialism and multiparty democracy. National Service was pioneered by TANU Youth League and was launched on 10th July 1963 (URT, 2011a). In 1964 National Service Act was passed to legalize the

establishment of National Service (URT, 2011a). The goal of National Service was best explained by the then President of the United Republic of Tanzania the late Mwalimu Julius Nyerere who said, "The meaning of National Service is the demand made by nation on the youths and youths response in fulfilling their duty in building the nation". It was a government intention that everyone had to go through National Service. Youth were not allowed to proceed to any other profession without passing through the National Service (Luanda, 2005).

National Service Act of 1964 has passed several amendments such as amendments of 1964, 1966, 1969, 1974, 1975 and 1982. However the major changes in the history of National Service in Tanzania occurred in 1975 where it was amalgamated with TPDF and become one of the four commands of TPDF operating under the Ministry of Defence and National Service (URT, 2011a). In 1994 another major change occurred in the history of National Service as the government decided to postpone the National Service for both volunteers and compulsory programs due to economic reasons in terms of heavy budgetary costs to the government. As a result the activities of the National Service deteriorated due to lack of manpower to operate them. However the permanent staffs maintained some of activities such as production through SUMAJKT. In 2001 National Service was reintroduced through voluntary scheme whereby SUMA JKT as economic wing was given more mandate for implementing various commercial activities such as agriculture, construction, livestock, tourism, mining, fisheries and furniture processing whereby national servicemen and women are recruited under voluntary scheme to serve for the period of two years (URT, 2011a). In 2013 the government has reintroduced the compulsory scheme for eligible youth who have completed form six education in high schools.

2.7 The Aim of National Service in Tanzania

The aim of the National Service is to build and prepare the youths to serve the community whose members are committed to the principles of human equality, brotherhood, patriotism and national unity so as to enhance qualities and roles of citizenship in Tanzania (URT, 1964). National service is an agency for building a sense of national identity to the young generation of Tanzanian society. Other of functions of the National Service is to train young citizens to serve the nation in the spheres of social and economic development alongside with the function of upbringing youths in defence of the country. National Service in Tanzania is a major reserve force and a source of recruitment for different security and defence branches such as TPDF and Tanzania Police Force (URT, 1975).

2.8 National Service Engagement in National Development in Tanzania

Military economic base can be used to manage economic resources to meet its own requirements or for the needs of civilian society (Janowitz, 1964). Due to the different factors different countries have unique determinants for utilization of military resources for the development purpose of the state and its people. For post-conflict states aiming at crisis management and peace building, the pressing need for military or security-development nexus is the necessity that there is no security without development and no development without security (Alamir, 2012). On the other hand, countries which have experienced stable political stability have determinants for military-development nexus that are attributed to number of factors such as; perception of political elites on provision of political will for military-development nexus, direction of security and defence policy, state institutional arrangements and development policy directives.

Despite being an institution of nurturing the youth with national values, principles and strategic interests such as patriotism, unity, equality, brotherhood and defence of the country, National Service in Tanzania is engaged in national development through implementation of different economic activities such as agriculture, construction, livestock and fisheries. National Service engagement on economic development of its society was institutionalized after establishment of SUMA JKT in 1981under the Corporation Sole Establishment Act of 1974. SUMA JKT is an economic wing of National Service for implementing different commercial activities done by National Service (URT, 2011a).

2.9 Army and Society

Discussion on army and society in this section is concentrated on how military can be used to build a sense of national identity. On answering the question how extensive is the impact of the military as an agency for building a sense of national identity, Janowitz (1964) argues military as an institution can be used as an agency for building a sense of national identity. Military can be used as an agency of socialization to provide a symbolic value of the military for the population as a whole. On the other hand there is a direct consequence of military service to the society. Reflecting such a view in Tanzania, National Service as an institution provides socialization among youth of different origins and cultural orientations towards building a sense of national identity. On the other hand National Service as a part of TPDF provides a symbolic value of military in the society whereby National Service serves as an agent of national building.

2.10 Theoretical Perspective of the Study

Theoretical perspective of the study was deduced from the concordance theory (Schiff, 1995) and citizen-soldiers conception (Nielsen, 2008). Concordance theory suggests an

alternative to civil-military relations theories under which the military, political elites and the citizenry should aim at cooperative relationship and unity as one of several types of civil-military relations. Concordance theory highlights dialogue, accommodation, and shared values or objectives among the military, the political elites and society with respect to the special historical and cultural experiences of a particular society. Concordance theory is opposite to classical traditional theories such as Huntington normative theory which suggests a separation of military from politics through objective control of civilian authorities over the military through the use of military professionalism among the officer corps as way to ensure stability. Concordance theory proposes stability can be achieved if the three partners agree on four indicators which are the social composition of the officer corps, the political decision-making process, recruitment method and military style.

Citizen-soldiers or soldier-statesman conception advocates a fusionist view that soldiers should participate in public life for the good of the community because military as an institution is a part of society. Citizen-soldiers conception proposes for citizen-soldiers through adjusting to the idea of integrating the military in society for the good of community. It is very dangerous to treat the military as an institution that does not form a part of society or to alienate the military from society. The military should follow the same rhythm of development as the rest of society and should keep up with political changes (Nielsen, 2008).

Reflecting such a view in Tanzania, it is evident that the military and civilians have co-existed together and their bond has been maintained through different methods such as National Service. Discussion of civil-military relations should not stop at the relationship between the government and the military. Attention should also be paid to the

relationships between military units and the rest of society (Lupogo, 2001). It should be noted that even where armies are limited in their political role they have economic and social functions which influence political change in society (Janowitz, 1964). Civil-military relations are not only the reflection of politics between the military and the political elites but also the reflection of the entire life of society under which the military as the agent operates at the best of the principal. The available literature on civil-military relations in Tanzania does not establish itself on the role of military in national development or modernization of the society. The trend of discussion on civil-military relations in Tanzania has given less attention to military-development nexus despite the fact that military through National Service has been the development partner in different economic activities such as agriculture. For the purpose of this study, the aspect of civil-military relations was limited to the citizenry in villages near National Service camps and National Servicemen and Women serving in Tanzanian National Service.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Description of the Study Area

3.1.1 Location of the study

The study was conducted in Handeni District in which Mgambo JKT is located. Mgambo JKT is one among National Service camps performing well in maize production especially in seed multiplication (URT, 2011a). Handeni District lies within the latitudes 4^0 55' and 6^0 04' South and within longitudes 37^0 47' and 38^0 46' East. It borders districts of Pangani and Muheza to the east, Korogwe and Simanjiro to the north, Kilindi to the west and Bagamoyo to the south (Fig. 2).

3.1.2 Topography

Handeni District has no coastline and the terrain is generally undulating with scattered high rising hills and upland areas mainly towards the western parts of the district. River Msangazi forms the main drainage of the district that lies between 600 to 1200 meters above sea level.

3.1.3 Climate

The District experiences the coastal type of climate which is characterized by high temperatures and humidity. Average temperatures vary from 27°C to 30°C. The cool season lies between the months of June and September, while the hottest one is between December and March.

3.1.4 Precipitation

Handeni District experiences heavy tropical rainfall which falls at any time of the year. There are two rain seasons which are short rains and long rains falling from October to December and from mid-March to June respectively. Mean annual precipitation is 800mm to 1500mm. The dry season is between July and September whereby the northern parts are drier than the rest of the district. The Monsoons, especially the south-eastern winds, are the main source of rainfall. The amount of rainfall received per year is enough to support crop growth such as maize, cassava and beans.

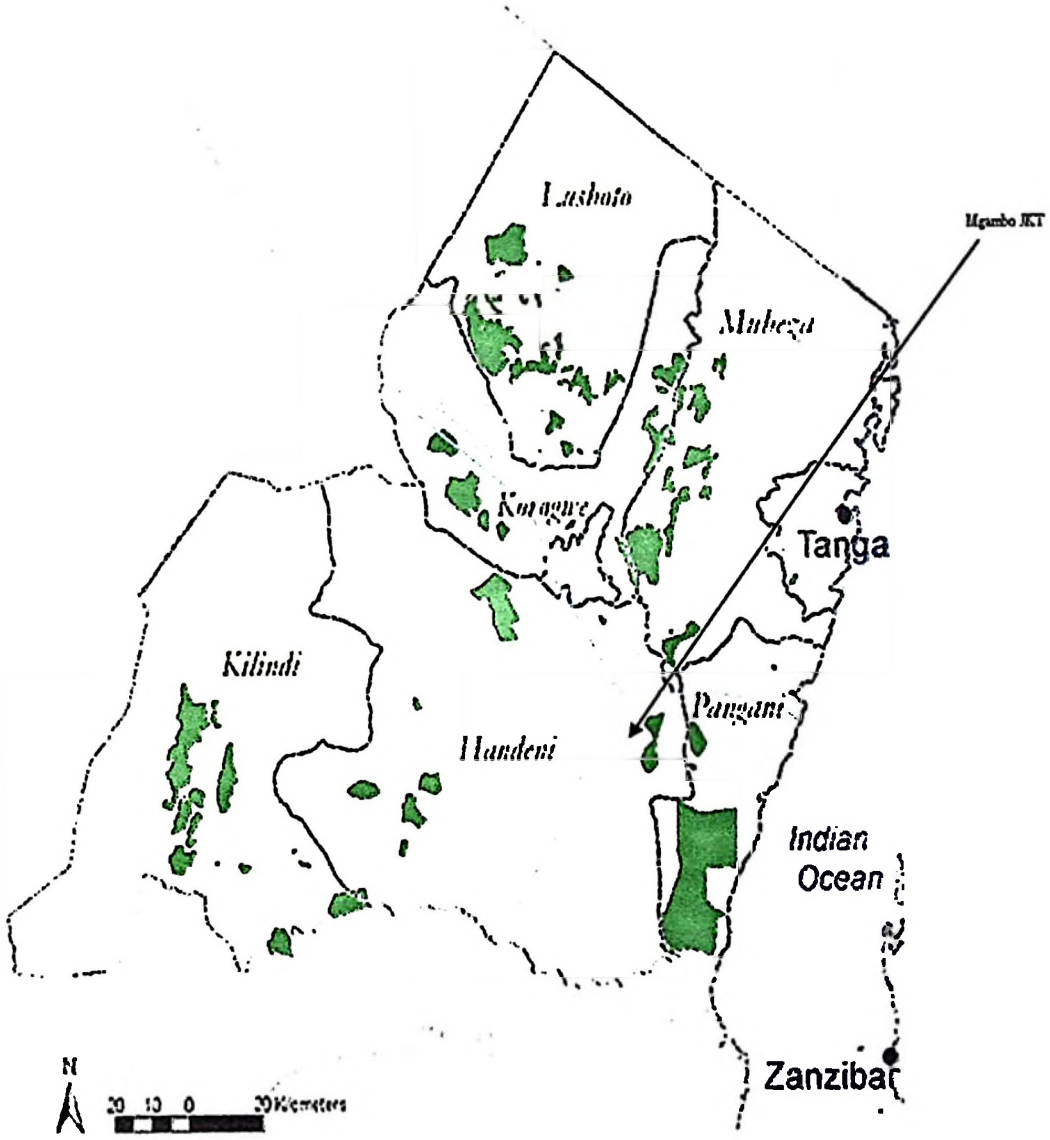


Figure 2: A Map of Tanga Region Showing Handeni District and Mgambo JKT

3.2 Research Design

Cross-sectional design was used whereby data were collected at one point in time from a sample chosen to represent a population.

3.3 Sampling Procedure

Mgambo JKT was purposively chosen as a case of National Service and it is among National Service camps specialized in crop-subsector such as maize production. Purposively location of villages near Mgambo JKT and far from Mgambo JKT was selected. Villages near and far from Mgambo JKT were randomly selected. Although all villages near and far from the Mgambo JKT are all found in Mzundu division, a baseline for distinguishing villages near and far from Mgambo JKT was based on villages which are physically bordered to Mgambo JKT and their social profile partly influenced by the camp. Villages found in Mgambo Ward such as Komsanga, Kwabojo, Kwadihwahwala and Gendagenda are all physically bordered to the camp and benefit from provision of social services such as roads, hospital and primary school created by civil-military environment between Mgambo JKT and surrounding villages. Kwabojo and Komsanga villages were random selected to represent villages near MgamboJKT.

On the other hand remaining wards in Mzundu division are Komkonga, Kabuku, Kabukundani and Ndolwa have villages which do not border to Mgambo JKT and their social profile is not dependent to the camp, hence villages on this criterion were treated as villages far from Mgambo JKT whereby Komkonga ward was random selected. Komkonga ward has five villages which are Komkonga, Hoza, Kwamachalima, Tuliani and Mumbwi. Komkonga and Hoza villages were random selected among five villages in Komkonga ward.

Maize farmers from villages near and far from Mgambo JKT were random selected basing on a criterion of harvesting for at least three consecutive seasons in order to establish trend of maize productivity. Two Focus Group Discussions were conducted on the side of communities near to Mgambo JKT so as to add value on information generated from interviews. Participants for Focus Group Discussions were purposively selected from maize farmers while considering gender, age and familiarity with the area. Key informants from Mgambo JKT were chosen in collaboration with the commanding office.

3.4 Sample Size

According to Bailey (1998), a sample of 30 respondents is enough for representative sample of a population as it is the bare minimum for study in which statistical data analysis can be done. Hence in this study an estimated sample size of 120 respondents was used. Sixty maize farmers were selected each from both villages near and far from Mgambo JKT.

3.5 Data Collection

Both quantitative and qualitative methods of data collection were used. For the first specific objective data for maize production by Mgambo JKT was obtained through their annual agricultural production reports and key informants. Data on the second objective ware collected from Handeni District Council. Data for the third and fourth specific objectives were collected through triangulation of survey and focus group discussions among maize farmers near and far from Mgambo JKT. Tools for data collection included a questionnaire and checklist of questions for household questionnaire survey and focus group discussion and key informant interview respectively.

3.6 Data Analysis

3.6.1 Unit of analysis

Units of analysis were Mgambo JKT and maize farmers near and far from Mgambo JKT.

3.6.2 Quantitative data analysis

Graphics for presenting descriptive statistics such as charts, histograms and trend lines were used to summarize quantitative data generated. Independent t-test was used to test significant difference in mean maize productivity between maize farmers near and far from Mgambo JKT. SPSS was used as an analytical tool for the data collected through questionnaire survey and Microsoft Excel was used for creating charts.

3.6.3 A model for an independent t-test of equal sample sizes

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{X_1 X_2} \cdot \sqrt{\frac{2}{n}}} \quad \text{.....(1)}$$

Where:

n= sample size

$\bar{X}_1$ and $\bar{X}_2$ = sample mean for group one and two respectively

$s_{X_1 X_2}$ = the grand standard deviation, 1 = group one, 2 = group two.

3.6.4 Qualitative data analysis

Content analysis was used to analyse qualitative information gathered through key informant interviews, focus group discussions and interviews. The data generated were categorized into meaningful units and themes in keeping with the research objectives.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Maize Production by Mgambo JKT

4.1.1 Maize farming practices by Mgambo JKT

Mgambo JKT practices a commercial farming in maize production whereby in partnership with seeds companies such as Agricultural Seed Agency (ASA) and Tanzania Seed Company (TAN-SEED), Mgambo JKT is multiplying improved maize seeds such as TMV-1 and TAN-250 for ASA and TAN-SEED respectively. However, this commercial farming is a rain fed agricultural practice.

Mgambo JKT being a training camp offers a practical experience to servicemen and women in agricultural production in different crops including maize. Recruits in Mgambo JKT are involved in different farming activities so as to cultivate on them a sense of responsibility and the spirit of self-reliance.

Mgambo JKT uses extension services in maize farming from professional officers and civilians employed in National Service and stationed at the camp. There is a use of tractors for different farming activities such as harrowing and ploughing. There is nonetheless, no use of fertilizers for maize production in Mgambo JKT farms. It has been an inherited practice in Handeni District that maize farmers do not use fertilizers in their farms (URT, 2012).

4.1.2 Land area used for maize production by Mgambo JKT from 2006 to 2012

Mgambo JKT has expanded her capacity in land area under cultivation in maize production in order to increase total output for maize seeds multiplication. The land area

used for maize farming has increased from about 28 hectares in 2006 to about 318 hectares in 2012. Land area used for maize production by Mgambo JKT from year 2006 to year 2012 is shown on (Fig. 3).

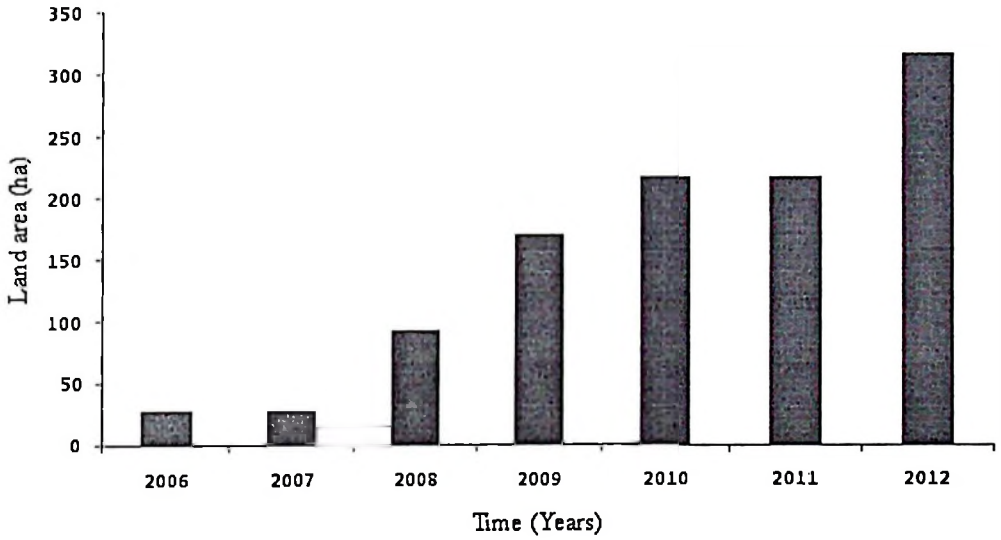


Figure 3: Land area used for maize production by Mgambo JKT

4.1.3 Total yield in maize production by Mgambo JKT from 2006 to 2012

Mgambo JKT has been increasing her capacity in maize production from 48 tonnes in 2006 to about 468 tonnes in 2011 and decreased to about 447 tonnes in 2012 due to rodent outbreak and erratic rainfall. Total maize yield produced by Mgambo JKT is given on (Fig. 4). Annual Report 2010/11 by Ministry of Agriculture, Food Security and Cooperatives (MAFC) showed National Service as a stakeholder in seed industry is implementing MAFC objective in enhancing sustainable agricultural production and productivity whereby out of the available 5678. 6 metric tonnes of improved seeds produced in the country, 1 489.1 metric tonnes were produced by National Service and Tanzania Prison Service (URT, 2011c).

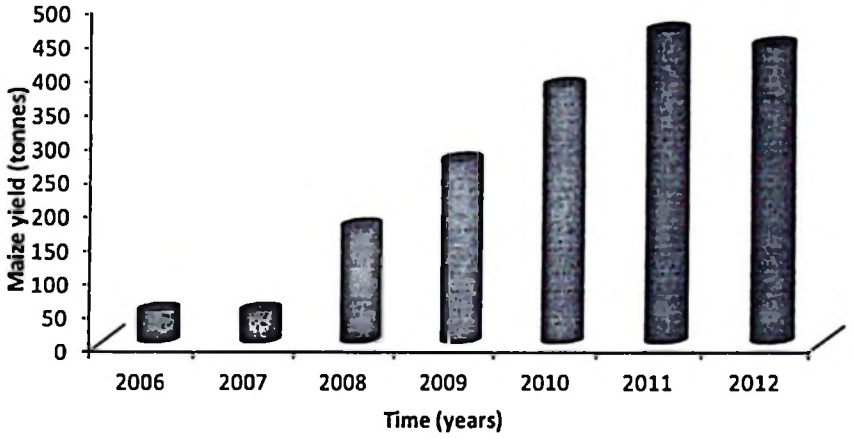


Figure 4: Total maize production by Mgambo JKT

4.1.4 Mean maize productivity of Mgambo JKT from 2006 to 2012

Mean maize productivity of Mgambo JKT was 1.7 tonnes per hectare in 2006-2007 seasons and increased to1.9 tonnes per hectare in 2008 season. In 2009 season mean maize productivity dropped to 1.7 tonnes per hectare and increased to 1.8 tonnes per hectare in 2010. In 2011 season maximum mean maize productivity was attained at 2.1 tonnes per hectare and decreased sharply to 1.0 tonnes per hectare in 2012 season. Probably, inadequate rainfall and an outbreak of rodents contributed to the decrease in mean maize productivity of Mgambo JKT in 2012 season despite measures taken to control the rodent outbreak. Rainfall and temperature are critical determinants of crops performance in a rain fed cropping system (Tumbo *et al.*, 2010). Hence erratic weather conditions such as low rain fall have an impact on agriculture performance. Mean maize productivity of Mgambo JKT is shown on (Fig.5).

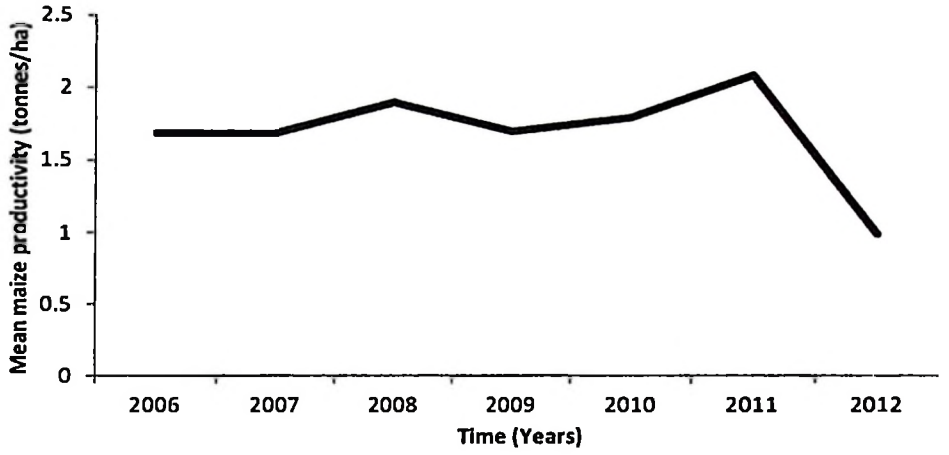


Figure 5: Mean maize productivity of Mgambo JKT

4.2 Proportion of Maize Produced by Mgambo JKT on Overall Handeni District Maize Production

In 2011 overall maize production in Handeni District was 68 184 tonnes whereby Mgambo Maize production was 468 tonnes which accounted for 0.7% of total maize production in Handeni District. On the other hand mean maize productivity by Mgambo JKT was 2.1 tonnes per hectare as compared to district productivity which was 1.6 tonnes per hectare.

In 2010 overall maize production in Handeni District was 68 839 tonnes and that of Mgambo JKT was 384 tonnes which was equivalent to 0.6% of total maize production in Handeni District. In relation to above, maize productivity by Mgambo JKT was 1.8 tonnes per hectare as compared to district productivity which was 1.5 tonnes per hectare.

In the year 2009 overall maize production in Handeni District and Mgambo JKT were 115 578 tonnes and 272 tonnes, respectively. Maize Production by Mgambo JKT was an estimate of 0.2% of the total maize production in Handeni District. Mean maize

productivity by Mgambo JKT was 1.7 tonnes per hectare and that of the district was 1.8 tonnes per hectare.

In 2008 overall maize production in Handeni District was 93 283 tonnes. Mgambo JKT Maize production was 174 tonnes which was equivalent to 0.2% of the total maize production in Handeni District. In terms of mean maize productivity, Mgambo JKT had 1.9 tonnes per hectare as compared to average district productivity which stood at 1.5 tonnes per hectare. Generally, Mgambo JKT has increased her proportion in overall district production from 0.2% in 2008 to 0.7% in 2011.

Although Mgambo JKT has higher maize production per unit area, its contribution in terms of percentage to the total maize production in Handeni District is low. This is due to small land area cultivated under maize production in Mgambo JKT as compared to the total area cultivated under maize production in Handeni District. Mgambo JKT as a large scale producer and a centre for maize seed multiplication has a higher contribution in terms of maize productivity as compared to other farmers in Handeni District who are mainly smallholder farmers. High maize productivity by Mgambo JKT makes the camp to be a role model and a source of spillover effects to surrounding villages in maize production in the Handeni District.

4.3 Maize Production by Farmers near and far from Mgambo JKT

4.3.1 Demographic characteristics of maize farmers

Demographic characteristics of maize farmers discussed under this section are age and sex.

4.3.1.1 Age of maize farmers

Age of respondents ranged from 21 to 30 years (17%), 31 to 40 years (23%), 41 to 50 (23%) and lastly about 37% of respondents were above 50 years. Mean age among maize farmers was 46 years. The findings for age from this study is in line with Tanga regional agricultural census report which showed that the mean age of agricultural household heads in the region was 45 years (URT, 2012). A detailed distribution of age of villagers with respect to the vicinity with the camp is indicated in Table 1.

Table 1: Age of maize farmers (n=120)

Variable compared		Near to the camp (%)	Far from the camp (%)
Age category	21-30 years	16.6	0
	31-40 years	20	3.3
	41-50 years	6.7	16.7
	greater than 50 years	6.7	30
Total		50	50

4.3.1.2 Sex of maize farmers

Majority (88%) of maize farmers interviewed were male and 12% were female. Simple random sampling was used to select farmers on a criterion of farming maize in the village for at least three consecutive years. Replacement of farmers was used in order to meet the criterion of farming maize for at least three consecutive years. Such replacement may be accountable for decrease in percentage of female farmers as some of farmers replaced were women. Some women did not practice farming in the area for three consecutive seasons due to reasons such as lack of capital and maternity leave. The proportion of agricultural households by sex in the district is 75% for male headed households and 25% for female headed households (URT, 2012). A distribution on sex of maize farmers among villages near and far from the Mgambo JKT is given in Table 2.

Table 2: Sex of maize farmers (n=120)

Variable compared		Near to the camp (%)	Far from the camp (%)
Sex of respondent	Female	7	5
	Male	43	45
Total		50	50

4.3.2 Farm size owned by maize farmers

The study showed that about 23% of maize farmers interviewed owned less than 2 hectares, while 38% of maize farmers owned between 2 to 4 hectares and 39% of farmers owned more than 4 hectares. A detailed distribution of farm size between farmers near and far from the camp is given in (Fig. 6).

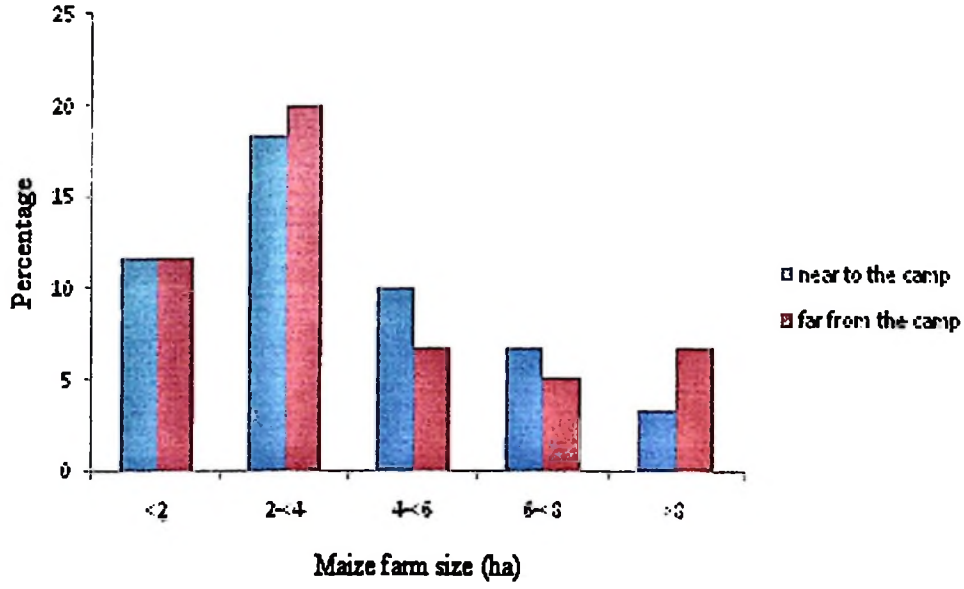


Figure 6: Farm size owned for maize farming

4.3.3 Land area used for maize farming between 2010 and 2012

Most (62%) of the respondents cultivated less than 2 hectares in 2012. A district by-law in Handeni requires every citizen to farm at least 1 acre (0.4 hectares) for a food crop such as maize. Findings from this study are in line with those shown in Tanga Regional agricultural census report which showed the regional average land area utilized for agriculture per household was only 1.7 ha. The figure is below the national average which is estimated at 2.0 hectares (URT, 2012). Also, the finding is in line with those reported in a study conducted by Tulahi and Hingi (2006) who found that most of farmers in Tanzania are smallholders operating between 0.2 and 2.0 hectares.

In the same year about one third (30%) of maize farmers interviewed cultivated between 2 and 4 hectares, while few farmers (8%) cultivated more than 4 hectares of maize. In 2011 about 58% of respondents cultivated less than 2 hectares, while 27% of them cultivated between 2 and 4 hectares and 15% of them cultivated more than 4 hectares of maize. In 2010 about 57% of maize farmers interviewed cultivated less than 2 hectares, whereas 35% of them cultivated between 2 and 4 hectares, and 8% of them cultivated more than 4 hectares. A trend of land area used for maize farming between 2012 and 2010 shows that about 60% of maize farmers cultivated less than 2 hectares.

Majority (90%) of farmers were unable to cultivate all their land allocated for maize farming. Handeni District recorded to be the lowest in land utilization in Tanga Region (URT, 2012). In relation to that, most (85%) of the farmers depended on hand hoe and lacked technology and capital; these factors were the stumbling block for optimization of maize production in their area. The mentioned barriers hindered maize farmers from cultivating large land despite the availability of land suitable for maize farming. Tulahi and Hingi (2006) also found that the major limitation on the size and utilisation of land

holdings is the lack of access to modern farming methods and heavy reliance on hand hoe as the main cultivating tool. The authors found that majority (70%) of farmers used hand hoe as the main tool for farming, one fifth (20%) of farmers used animal draft plough and minority (10%) used tractors.

4.3.4 Farming practices by maize farmers in the study area

4.3.4.1 Use of improved seeds

In the study area about one fifth (20%) of respondents near to the camp and about one third (30%) of respondents far from the camp reported to use improved seeds in their farms. Majority of the maize farmers (80%) near and (70%) far from the camp reported to use local seeds in their farms. The finding from Tanga Regional agricultural census report is in line with the findings from this study by mentioning that Handeni District is among the districts with smallest use of improved seeds at about 8%. Majority of farmers use local seeds (URT, 2012).

4.3.4.2 Fertilizer, tractor, herbicides and insecticides usage

All of maize farmers (100%) near and away the camp did not use fertilizers in their farms. Findings from this study are in agreement with those reported in Tanga Regional agricultural census report which showed that among all districts, farmers from Handeni district do not use any fertilizer at all (URT, 2012). Similary, no farmers near or away from the camp owned or used tractors for maize farming whereby hand hoe farming was reported to be a dominant practice. Tulahi *et al.* (2006) cited in Mnenwa and Maliti (2010) also found that minority (10%) of farmers in Tanzania used tractors while majority (70%) used hand hoe as their main tool for farming. By the same token, all of maize farmers (100%) near and far from the camp did not use herbicides and insecticides at all. In agreement with findings from this study, Tanga regional agricultural census report also

showed that there were no households using herbicides in Handeni District (URT, 2012). Table 3 shows inputs usage for maize farmers in the study area.

Table 3: Inputs usage by maize farmers near and far from Mgambo JKT (n=120)

Input used	Response	Near to the camp (%)	Far from the camp (%)
Seeds usage	Local seeds	80	70
	Improved seeds	20	30
Fertilizers usage	No	100	100
	Yes	0	0
Use of tractors	No	100	100
	Yes	0	0
Herbicides usage	No	100	100
	Yes	0	0
Insecticides usage	No	100	100
	Yes	0	0

4.3.4.3 Rodent control

In season 2012 maize farmers near to the camp reported an outbreak of rodents in their farms. About 43% of the respondents employed methods of rodent control such as use of traps and poison while 67% of respondents did not use any methods to control rodents in their farms. On the other hand, maize farmers far from the camp did not report serious outbreak of rodents and all of them (100%) did not use any methods of rodent control. Farmers in Sub-Saharan Africa are faced with risks such pest which in return decrease productivity among farmers (M'mboyi *et al.*, 2010).

4.4 Spillover Effects of Mgambo JKT to Maize Farmers of the Surrounding Villages.

4.4.1 Mgambo JKT maize farms as demonstration farms to farmers of the surrounding villages

Majority (70%) of farmers near the camp viewed Mgambo JKT maize farms as demonstration farms, while one third (30%) of them did not view it that way. Similarly, results from focus group discussions, it was revealed that maize farmers near the camp

perceived the presence of Mgambo JKT maize farms in their area as the demonstration from which farmers can observe improved practices such as: the use of improved seeds, planting of two maize seeds instead of three or four maize seeds per hole for increased yield, appropriate spacing, row planting, importance of harrowing, cleanness of farms, observation of planting calendar and learning the sense of hard working. Table 4 indicates the view of maize farmers near the camp towards the statement Mgambo JKT maize farms are kinds of demonstration farms to the surrounding villages.

Chi and Yamada (2002) reported that for adoption or diffusion of agricultural technology to occur there are number of factors that influence the extent of adoption of technology. Among such factors is the change agent. Mgambo JKT is an example of change agent to the surrounding farmers as the camp provides demonstration of improved farming practices to the surrounding villages. Table 4 shows the proportion of farmers who view Mgambo JKT maize farms as a demonstration.

Table 4: Views of farmers whether Mgambo JKT maize farms are demonstration farms to the surrounding villages (n=60)

Response	Frequency	Percent
No	18	30
Yes	42	70
Total	60	100

4.4.2 Social interactions between villagers and Mgambo JKT and spread of agricultural knowledge on maize production to nearby farmers

Ten percent of respondents reported to have received agricultural knowledge from the camp as the result of social interaction among villagers and Mgambo JKT workers.

Although there is no formal outreach programme from the camp, from focus group discussions, it was shown that some farmers sought advice from agricultural experts of the camp. Some advice mentioned by maize farmers included the importance on the use of improved seeds, proper spacing and row planting.

Mansfield (1963) viewed diffusion as a process of imitation wherein contacts with others led to the spread of technology. Reflecting on such a view of diffusion as the result of spillover effects from Mgambo JKT to surrounding villages; social interaction among villagers and Mgambo JKT workers is one of the factors contributing to spread of improved agronomic practices from the camp to surrounding villages.

Table 5: The impact of social interactions between villagers and Mgambo JKT on the spread of agricultural knowledge on maize production to nearby farmers (n=60)

Response	Frequency	Percent
No	54	90
Yes	6	10
Total	60	100

4.4.3 Imitation of improved maize farming practices from Mgambo JKT by the surrounding villages

Rogers (1983) defined diffusion as the process by which an innovation is communicated through certain channels over time among the members of social system. In this study, the concept of diffusion was used to explain the spread of spillover effects from Mgambo JKT to the surrounding communities. The concept of diffusion as borrowed from Chi and Yamada (2002) was used in terms of understanding how many maize farmers know and use improved farming practices imitated from Mgambo JKT. The purpose was to

determine how many people in the villages surrounding Mgambo JKT have been affected by spillover effects produced by the camp. Hence it was appropriate to find out the proportion of farmers who have imitated improved maize farming practices from Mgambo JKT as the result of spillover effects.

Fifty percent of maize farmers interviewed reported to have imitated maize farming practices such as importance of recommended spacing, row planting, harrowing, use of improved seeds, timely planting, farm cleaning, learning the sense of hard working and planting two maize seeds instead of three or four maize seeds per hole for increased yield. Imitation of improved practices of Mgambo JKT by some maize farmers is the result of spillover effects produced from Mgambo JKT to the surrounding villages.

It was also revealed during focus group discussions that some maize farmers had imitated different practices such as recommended spacing, row planting, use of improved seeds, planting two maize seeds instead of three or four maize seeds per hole as optimum planting rate for increased yield, importance of harrowing, timely date of planting, farm cleaning and learning the sense of hard working from National servicemen and women.

On the other hand, half (50%) of respondents reported that they have not imitated any maize farming practices from Mgambo JKT. During focus group discussions, it was revealed that farmers were unable to imitate all farming practices from the Mgambo JKT as the opportunity for them was limited to observation. Some farmers identified lack of planned outreach programme and consultation from Mgambo JKT on ensuring knowledge transfer and diffusion of improved farming practices to the farmers near the camp. The structure of a social system can facilitate or impede the diffusion of innovations in the system (Rogers, 1983). Lack of planned outreach programme between

Mgambo JKT and surrounding villages as the result of social system in the existing civil-military environment impede the rate of imitation of improved maize farming practices. Moreover, consultation is among extension principles that facilitate technological transfer (Mwangi, 1998). Lack of consultation on what farmers observe from Mgambo JKT farms was reported to be an obstacle towards imitation of the demonstrated practices. Table 6 shows the proportion of maize farmers who have imitated farming practices from the Mgambo JKT.

Table 6: Imitation of farming practices from the Mgambo JKT by the surrounding villages (n=60)

Response	Frequency	Percent
No	30	50
Yes	30	50
Total	60	100

4.5 Mean Maize Productivity of Farmers near and far from the Camp

4.5.1 A trend of mean maize productivity for farmers near Mgambo JKT

A trend of mean maize productivity of farmers near Mgambo JKT increased from 1.7 tonnes per hectare in 2010 to 2.0 tonnes per hectare in 2011 and dropped to 0.4 tonnes per hectare in 2012. Farmers attributed low mean maize productivity in season 2012 to rodent outbreak and inadequate rainfall. The average productivity of farmers near the camp is 1.4 tonnes per hectare between 2010-2012 seasons. This average productivity is slightly higher to average productivity of 1.3 tonnes per hectare in Sub-Saharan Africa. On the other hand the average productivity of farmers near the camp is far low as compared to other parts of the world. Average maize productivity on other parts of world were estimated at 3.8 tonnes per hectare in Brazil, 3.1 tonnes per hectare in Mexico, 2.5 tonnes

per hectare in the Philippines and 3.9 tonnes per hectare in Thailand. In addition to that most of industrialized countries have the highest average productivity of 8 tonnes per hectare (M'mboyi *et al.*, 2010; Smale *et al.*, 2011). Mean maize productivity for farmers near the camp is shown on (Fig. 7).

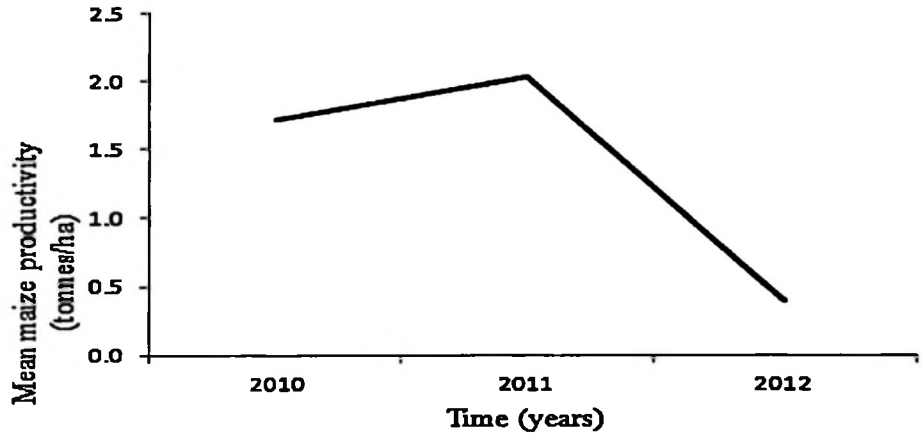


Figure 7: Mean productivity of maize farmers near to the camp

4.5.2 A trend of mean maize productivity for farmers far from Mgambo JKT

A trend of mean maize productivity of farmers far from the camp increased from 1.0 tonnes per hectare in 2010 to 1.2 tonnes per hectare in 2011and decreased to 0.6 tonnes per hectare in 2012. Decrease in maize productivity in 2012 was attributed to rodent outbreak and inadequate rainfall. Maize farming in Sub-Saharan Africa is faced with risks such as erratic weather conditions, poor soils, pests, diseases, poor markets facilities and lack rural infrastructure (M'mboyi *et al.*, 2010). In relation to that any risks factor such as erratic weather conditions and outbreak of pests result in a sharp decrease in productivity. Mean maize productivity for farmers far from the camp is given on (Fig.8).

Figure 8: Mean productivity of maize farmers away from the camp

4.6 Comparison of Mean Maize Productivity between Maize Farmers near the Camp and those far from the Camp

4.6.1 T-test for mean maize productivity for maize farmers near and away from the camp in 2012

In 2012, an independent t-test on mean maize productivity between maize farmers near and far from Mgambo JKT by assuming equal variances accepted the null hypothesis ($p > 0.05$). The mean maize productivity of maize farmers near Mgambo JKT did not differ significantly from that of maize farmers far from Mgambo JKT. A detailed result of t-test between maize farmers near and far from Mgambo JKT is given in Table 7.

4.6.2 T-test for mean maize productivity of maize farmers near and away from the camp in 2011

In 2011 an independent t-test assuming equal variances rejected the null hypothesis ($p < 0.001$). Mean maize productivity for farmers near Mgambo JKT differed significantly from that of maize farmers far from Mgambo JKT. Maize farmers near the camp had more mean maize productivity than maize farmers far from the camp and their

difference in mean maize productivity was significant. A detailed result of t-test between maize farmers near and far from Mgambo JKT is given in Table 7.

4.6.3 T-test for mean maize productivity of maize farmers near and away from the camp in 2010

In 2010, an independent t-test assuming equal variances rejected the null hypothesis ($p < 0.001$). Mean maize productivity for farmers near Mgambo JKT differed significantly from that of maize farmers far from Mgambo JKT. Maize farmers near the camp had more mean maize productivity than maize farmers far from the camp and their difference in mean maize productivity was significant. A detailed result of t-test between maize farmers near and far from Mgambo JKT is presented in Table 7.

Table 7: Independent t-test for mean maize productivity of farmers near and far from Mgambo JKT (2010-2012)

Variable compared	Vicinity of village with respect to the camp	n	Mean	Std. Deviation	Mean Difference	t-value	p-value
Maize productivity (tons/ha) in 2012	Near to the camp	60	0.3970	0.56794	-0.17833	-1.238	0.221
	Far from the camp	60	0.5753	0.54763			
Maize productivity (tons/ha) in 2011	Near to the camp	60	2.0377	1.04621	0.87767	3.919	<0.0001
	Far from the camp	60	1.1600	0.64062			
Maize productivity (tons/ha) in 2010	Near to the camp	60	1.7163	0.82301	0.72733	3.768	<0.0001
	Far from the camp	60	0.9890	0.66364			

4.7 Discussion on the Impact Spillover Effects Produced by Mgambo JKT towards Improving Maize Production to the Surrounding Villages

Agricultural intervention in an area may result into the spillover effects. A decision taken by National Service to make Mgambo JKT as one of the camps specialized on agriculture production especially in maize seed multiplication resulted to the spillover effects. Imitation of improved agronomic practices of the camp by farmers in the surrounding villages is an illustrative example of spillover effects produced. Hence in order to explain the difference on maize productivity between farmers near and far from Mgambo JKT in 2011 and 2010 seasons as the result of spillover effects, the result of this study was compared to other studies relating to diffusion of improved agronomic practices and agricultural technologies.

The study by Morris *et al.* (1999) on adoption and impact of improved maize production technology indicated that farmers who had intervention on improved maize technologies such as use of improved seeds and row planting; majority (60%) of them had increased productivity. In the same token, spillover effects produced by Mgambo JKT affect maize productivity of nearby villages. Farmers near Mgambo JKT imitated improved agronomic practices such as improved seeds, row planting, recommended spacing, use of improved seeds and timely planting as the result there is an increase in productivity as compared to farmers far from Mgambo JKT. In relation to that, Muzari *et al.* (2012) have indicated that increased agricultural productivity and technology adoption rates can be achieved through number of factors such as improved agronomic practices and extension linkages. The use of agricultural technologies affects the rate of increase in agricultural output. An increase on technology development enhances the raise on agricultural output among farmers.

On other hand, the season 2012 showed no significant difference in mean maize productivity between farmers near and far from the camp. Rodent outbreak in maize fields caused the sharp decrease in mean maize productivity in the study area hence the lack of impact of spill over effects by Mgambo JKT on maize productivity among nearby farmers as compared to those far from the camp.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

i. This study has given an account for contribution of Mgambo JKT on agricultural production by assessing maize production by Mgambo JKT and its spillover effects towards maize production of surrounding communities.

ii. This study has shown that Mgambo JKT maize production for seed multiplication capacity has increased from 174 tonnes in 2008 to 447 tonnes in 2012. The camp has been expanding its capacity for maize production and seed multiplication through increasing the area under production from 28 hectares in 2006 to 318 hectares in 2012. However, challenges such as dependence on rain-fed agriculture affect productivity capacity of the camp. Dependence on rain-fed agriculture is not a reliable practice for modern commercial maize farming and it provides a risk of low productivity on maize production and seed multiplication when encountered with a season of minimum rainfall like that experienced in 2012 long rain season in study area.

iii. The contribution of Mgambo JKT in terms of the proportion in overall Handeni District maize production has increased from 0.2 % in 2008 to 0.7% in 2011.

iv. The study concludes that spillover effects produced by Mgambo JKT towards surrounding villages has benefited maize farmers near the camp. Some farmers nearby the camp viewed Mgambo JKT farms as demonstration farms, which in return provide them with an opportunity to imitate improved practices of the camp

such as proper spacing, row planting, use of improved seeds, planting two seeds per hole instead of three or four, harrowing, farm cleaning and observation of planting calendar.

v. On the other hand, some farmers nearby the camp have not imitated or benefited from the spillover effects produced by the camp. The existing civil-military environment between the camp and surrounding villages has no planned outreach programme to ensure the flow of agricultural related technologies and extension services from the camp towards farmers of surrounding villages. The spillover effects produced in the existing civil-military environment between the camp and surrounding villages is limited to individual farmer's observation of Mgambo JKT farms and informal social interaction among villagers and Mgambo JKT workers.

vi. Referring to the hypothesis which stated that 'maize productivity differs significantly between farmers near and far from Mgambo JKT', it was seen that mean maize productivity (tonnes per hectare) of farmers near Mgambo JKT was higher than that of far from the camp. By holding other factors constant Mgambo JKT was seen to have spillover effects on maize production in surrounding communities.

5.2 Recommendations

i. In order to increase production efficiency in maize production and maize seed multiplication for commercial purpose, Mgambo JKT should invest highly in increasing area under production as a way to expand production capacity in maize production and seed multiplication.

ii. In order to have a modern commercial farming, National service camps should seek an alternative of rain-fed agriculture by establishing irrigation schemes. Dependence on rain-fed agriculture is risky and uncertain due to climate change which causes erratic weather conditions.

iii. In order to become a centre of excellence in agricultural production at district, regional and national levels; National service camps should envision towards increasing agriculture production through increasing use of agricultural related technologies and full utilization of land mandated for agriculture production. This will increase the contribution of National Service in the share of the GDP of agriculture sector at local and national levels; food produced will increase the national food reserve and make National Service as an important stakeholder in ensuring food security in the country. On the other hand improved seeds produced as the result of seed multiplication in different camps will make National Service an important stakeholder on seed industry in Tanzania.

iv. In order to ensure the full participation of National Service in implementation of Kilimo Kwanza, there should be a planned outreach programme for National Service camps towards improving agricultural production of surrounding communities.

v. National Service should establish the Agricultural Consultancy Desk (Dawati la Ushauri Kilimo) for consultancy, research and dissemination of agricultural related technologies and information towards rural farmers and agricultural development as a whole.

vi. National Service should cooperate with the Ministry of Agriculture, Food Security and Cooperatives so as to enable District Agricultural and Livestock Development Offices in areas with National Service camps specialized in agricultural production to establish a joint delivery programme of extension services to farmers so as to strengthen the existing system of extension services.

vii. Conducive civil-military environment between National Service camps and surrounding communities should be maintained and improved in order to strengthen spillover effects flowing from National Service camps to surrounding communities and vice versa.

5.3 Areas for Further Research

i. Further studies should be done in order to get a more detailed picture on contribution of National Service in agricultural development as this study was limited to the case of one National Service camp.

ii. In search for alternatives on change or modernization agents in rural development, more research should be done in order to come up with policy suggestions towards improving the role of National Service on rural agricultural development.

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APPENDICES

Appendix 1: Operational Definition of Variables

Dependent variable	**Operational definition**	**Level of measurement**	**Unit of measurement**
Agricultural production	Farm yield by crop in a given season	Ratio	Tonnes or tonnes per hectare
Independent variables	**Operational definition**	**Level of measurement**	**Unit of measurement**
Land used	Area under cultivation in a given season	Ratio	Hectares
Tractor use	Use of tractors for farming activities	Ratio	Number of tractors
Improved seeds	Use of improved seeds	Nominal	Yes or No
Fertilizer	Use of fertilizers	Nominal	Yes or No
Insecticides control	Use of insecticides in farms	Nominal	Yes or No
Herbicides control	Use of herbicides in farms	Nominal	Yes or No
Rodent control	Control of rodents during outbreak	Nominal	Yes or No
Extension Services	Agricultural education and technical assistance provided	Ratio	Number of contacts per season or number of extension officers

Appendix 2: Questionnaire administered to maize farmers in order to analyze the spill over effects of Mgambo JKT on surrounding communities' agricultural production.

Questionnaire number.....

A. Basic Information

1. Date .....

2. District .....

3. Division.....

4. Village.....

5. Name of the Head of Household.....

6. Age.....

7. Gender..... 1 = male ( ) 2 =female ( )

8. Farmer's years in farming in the area.....

B. Crop Production Information

9. What is the total farm size of land (in acres) used for maize farming activities by the household? .....

10. What is the average yield of maize per acre? .....

11. How much (yield of maize in bags) did you produce in the last three seasons?

Year	Acres	Yield of maize in bags	Productivity(Tonnes/hectare)
2012			
2011			
2010			

12. What type of labour did you use in the last season (2012)? 1= family labour ( )

2=hired labour ( ) 3= both ( )

13. Indicate the number of people used in family labour per season.....

14. Indicate number of hired labour used per season.....

15. For hired labour used, indicate cost per operation (T.shs) per acre.....

16. Do you purchase any inputs for farming? 1= Yes ( ) 2= No ( )

Input	Agricultural season (2012-2010)	
	Number of items	Cost
Hand hoes		

Input	Agricultural season (2012-2010)		
	Type of machinery	Number of machinery	Operational cost per acre
Tractorized machinery			

Inputs	Amount in(kg per acre) or (litres per acre)	Unit price per acre
Fertilizers		
Improved seeds		
Herbicides		
Insecticides		
Pesticides		
Others		

C. Spill over and outreach effects of Mgambo JKT on surrounding communities' agricultural production.

17. Do you benefit from the presence of National Service (Mgambo JKT) in your area?

1= Yes ( ), 2= No ( )

18. If yes, what benefits do you gain from the Mgambo JKT (relate your answer to maize production)?

.....

.....

19. Tick the appropriate services you benefit from presence of Mgambo JKT in your area

Spill over and outreach effects of Mgambo JKT on surrounding communities	Yes	No
Accessibility to agricultural technologies such as improved seeds		
Accessibility to training such as demonstration farms		
Accessibility to extension services		
Accessibility to causal labour opportunities		
Have you imitated any improved farming practices from Mgambo JKT		

20. Are there any other benefits? Mention them.

.....

.....

Thank you so much for your cooperation

Appendix 3: Checklist for focus group discussion on the spillover and outreach effects of Mgambo JKT on surrounding communities' agricultural production.

- Do you benefit from the presence of the Mgambo JKT in your area?
- What benefits, relate your answer to agricultural production in different crops such as maize and others in your area?
- From benefits gained from the presence of Mgambo JKT in your area, is there any change in agricultural productivity of different crops such as maize and others?
- What do you think should be improved in order to extend benefits produced from the presence of Mgambo JKT in your area?

Appendix 4: Check list for Key Informant Interview on contribution of Mgambo JKT to agricultural production

1. What was the maize production in the last seven seasons?

Year	Total maize yield of the camp (tonnes)	Average productivity of maize in (tonnes per hectare)	Land used (in hectares)	Causal labour Used (number of people per season)	Volunteer used (number of volunteers per season)	Capital used (T.Shs)	Extension services (number of extension officers)
2006							
2007							
2008							
2009							
2010							
2011							
2012							

Break-down of capital used

Input	Amount in (kg per hectare) or litres per hectare		Unit price(T.sh) per hectare
Improved seeds			
Fertilizers			
Insecticides			
Herbicides			
Pesticides			
Tractorized machinery	Type of machinery	Number of items	Operational cost per hectare

2. Spill over and outreach effects of Mgambo JKT on surrounding communities.

How are the surrounding communities benefiting from the presence of the camp.

.....

.....

.....

3. What services are provided by the camp to help surrounding communities improve their agricultural production?

.....

.....

.....

4. Tick the appropriate services surrounding community benefits from presence of Mgambo JKT in their area.

Spill over and outreach effects of Mgambo JKT on surrounding communities	Yes	No
Accessibility to agricultural technologies such as improved seeds		
Accessibility to training such as demonstration farms		
Accessibility to extension services		
Accessibility to labour opportunities		
Has the surrounding community imitated any improved farming practices from Mgambo JKT		

Thank you so much for your cooperation.