THE ROLE OF GOLD EXPORT IN AGRICULTURAL DEVELOPMENT AND POVERTY ALLEVIATION IN TANZANIA

A

THESIS

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ECONOMICS

Cairo Paul Mwaitete
Enrollment Number: 13SAHS302001

SCHOOL OF HUMANITIES AND SOCIAL SCIENCE

FACULTY OF ECONOMICS

DECLARATION

I hereby certify that the work which is being presented in the thesis, entitled "**The Role of Gold Export in Agricultural Development and Poverty Alleviation in Tanzania"** in fulfillment of the requirements for the award of the degree of Doctor of Philosophy in Faculty and submitted in Galgotias University, Greater Noida is an authentic record of my own work carried out during a period from 2013 to 2017 under the supervision of **Professor (Dr.) Ranjul Rastogi**

The matter embodied in this thesis has not been submitted by me for the award of any other degree of this or any other University/Institute.

(Cairo Paul Mwaitete)

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

Professor (Dr.) Ranjul Rastogi
Supervisor

School of Business

The Ph.D. Viva-Voice examination of _____ Research Scholar, has been held on _____ .

Sign. of Supervisor(s) Sign. of External Examiner

ABSTRACT

This study is about the Role of Gold Export in Agricultural Development and Poverty Alleviation in Tanzania. Given the complexity of the study itself, the researcher applied both qualitative and quantitative approaches to investigate and derive the problem and coming up with practical solution for Tanzania economy towards agricultural development and Poverty Alleviation given gold production and export. It is evidenced in the literature that Tanzania is identified to be among the African countries with gold deposits, production and export after South Africa and Ghana. It is the 15th world gold producer as validated in the literature.

Therefore the researcher uses time series data covering the period 1990 to 2014 where granger causality and cointegration has been used for the quantitative purposes. Also cost and benefits approaches has also been used to draw conclusion regarding farm investment and condition to date. For qualitative purposes researcher applied questionnaires, interview and discussions in order to get data on first hand information from individuals covering the period of September 2015 to March 2016. Researcher visited Arusha- Karatu District (Mbulumbulu ward the village of Kambi ya Simba), Manyara -Mbulu District in the village of Bargish antsi and Moringa – Daudi to examine the state of agriculture and possible constraints. The researcher also visited gold producing area of Chunya district in Mbeya region. Arusha urban district was also visited to examine the awareness of gold value and role of gold in poverty alleviation. Despite the difficult living condition and low agricultural productivity observed by the researcher for the individual farmers, they still believe that agriculture is the main activities that if supported by the government it can assist in alleviating poverty among majority. Researchers also observed several constraints in agriculture productivity that needs support from the government through gold export.

Data reveals that Tanzania has failed to capture gold export tax push for agricultural development in the country starting from the year 1990 to 2014 see the lost opportunity from gold export that could have been captured to push development in the country especially in agriculture hence poverty alleviation. It was again discovered by the researcher through causality relationships, that gold export plays a significant role in the agricultural productivity in Tanzania if well mapped out. This is evidenced from the findings that gold export granger cause agricultural productivity

and growth. Also cointegration between gold export and agricultural productivity (at 5 lags) that the variables are cointegrated. Also in the short run and long run gold export has causality impact on agriculture productivity, vector error correction model (VECM) validate this. The more gold we export the more agricultural productivity is expected to be realized for the future given the right policies for gold to account for agriculture productivity. It was revealed in the study that gold production for export granger causes poverty alleviation and poverty alleviation also granger cause gold production for export at lag six. It was also revealed that there is cointegration between the named variables. Short run and long run exist also VECM validate the findings that calls for more gold production and export in Tanzania.

Furthermore based on the granger causality Wald test results the probability value and the level of significance at 5% the researcher found that there is granger causality moving from Gold Production Growth Rate (DGOLDPDGR) to Gross Domestic Product Annual Growth Rate (DGDPR).Likewise there is granger causality moving from Gross Domestic Product Annual Growth Rate to Gold Production Growth Rate. The researcher concluded that great care regarding policies and other implications should be formulated for better results of Gold Production Growth Rate (DGOLDPDGR) in enhancing Gross Domestic Product Annual Growth Rate (DGDPR). The study reveals also that there is cointegration among the variables Gross Domestic Product Growth Rate and Gold Production Growth Rate. The study found there is short run causality running from Gold Production Growth Rate (L1, L2, L3, L4, L5, L6) to Gross Domestic Product Growth Rate.

Therefore the study recommend that firstly Gold export tax push should be introduced to help push the agriculture sector since the value of gold is high and stable value than the local currency and the USA $, the government should enjoy the maximum revenue without doubt. Gold tax push on gold export should be introduced at the initial stage of this recommendation for the better results in agricultural growth(see the forecasted gold revenue trend 2015-2030). The proposed gold tax push is expected to push the agriculture sector to the right at $Agric_2$ from the initial of $Agricp_0$ .This annual amount of gold export tax push uncovered in this study when targeted, could make revolution in agriculture in Tanzania while improving livelihood of the majority people, income and poverty alleviation in the country. The targeted

amount can be used to improve farm technology and machines, training farmers, setting up farm infrastructure and agricultural inputs given the arable land. The country will be self-sufficient with food and reduced hunger among citizens. Secondly government must introduce special curricular in primary schools, secondary schools, universities and other vocational trainings on gold production, processing, gold value, quality and market for gold.

Thirdly Tax officials must be empowered to detect raw gold export values also gold export in the form of bars and ensure local people benefit more than the multinational companies who currently enjoy maximum revenue on gold export. Fourthly, Giant firms and governments in the world involved in the gold production and export in Tanzania and Africa must increase responsibility, accountability and transparency on gold production, gold export and tax deals, incentives by the government to giant firms must be minimized and that more money gained from sales of Gold export and other natural resources to a large extent must be ploughed back to domestic economy before its depletion point and bring about development in the country. Lastly the government must support local small miners with technology and skills on gold production, export and processing through special programmes to local miner.

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Cairo Paul Mwaitete

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International Publications

The following is the key publications done on international journals with impact factors;

1. Rastogi R and Mwaitete C.P (2017), Significance of Agriculture in Poverty Alleviation: A Case of Maize Farmers in Northen Tanzania , Advances in Economics and Business Management (AEBM) p-ISSN: 2394-1545; e-ISSN: 2394-1553; Volume 4, Issue 7; July-September, 2017, pp. 463-468, Krishi Sanskriti Publications

2. Rastogi R and Mwaitete C.P (2016), Maize Farm Constraints and Profitability, Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-10, 2016 ISSN: 2454-1362

3. Mwaitete C.P and Rastogi R(2016), Relationship Between Gold Export and Gross Domestic Product in Tanzania. Journal of Advance in Economics and Business Mangement(AEBM), e-ISSN;2394-1553,p-ISSN:2394-1545;Volume 3,issue 7,July September 2016, Krishi Sanskriti Publications

4. Mwaitete, C.P (2016), Gold Export and Economic Growth: Granger Causality and Co-integration A Case Of Tanzania. Imperial Journal of Interdisciplinary Research, Volume 2 issue (12),ISSN: 2454-1362

5. Mwaitete C.(2014), Critical Analysis of Poverty alleviation Strategies and the Use of Natural Resources: A case of Tanzania, ZENITH International Journal of Business Economics & Management Research, ZIJBEMR, Vol.4 (9), SEPTEMBER (2014), ISSN 2249- 8826

6. Mwaitete C.(2015), Agricultural Investment Decision and Financing for Rural Farmers in Tanzania, ZENITH International Journal of Business Economics & Management Research, ZIJBEMR, Vol.5 (6), JUNE (2015), ISSN 2249- 8826 on available online.

List of Abbreviations

ADF : Augmented Dickey Fuller

FDI : Foreign Direct Investment

GDP : Gross Domestic Product

IMF : International Monetary Fund

NPV : Net Present Value

L1,L2,L3 etc : Time lag or lag period

PP : Philips Perron

TMAA : Tanzania Mineral Audit Agency

TAFSIP : Tanzania Agriculture Food Security and Investment Plan

VAR Model : Vector Auto Regression Model

VECM : Vector Error Correction Model

IOA : Input Output Tabl

CHAPTER ONE

INTRODUCTION

In Tanzania the agriculture sector employ 80% of the work force and majority them are from rural areas. This means making revolution in agriculture is the poverty alleviation strategy and income to rural people. Many studies have shown that agriculture provides an effective means of reducing poverty and improving the economy and livelihood in a country and this is supported by African Development Bank(2004),(Raymond and Malit 2010) and others .Tanzania is believed to be among the country in the world with abundant natural resources including water resources(surface water and underground water), land resources, forest, and mineral resources like gas, gold, diamond, uranium and others as revealed by Allan (2008), Africa Report(2013), and others validate this. All these resources contribute little to mass poverty whose population is engaged in agricultural activities. It is also observed that Tanzania GDP growth rate has also been at constant rate of almost 7% per annum in the past ten years but this growth has not been poverty inclusive and this is calling for further investigation. Gold resources stock and production activities do not match with our level of poverty this shows that there is a need to assess the role of gold resources to account for poverty alleviation through promoting agriculture.

It is also observed from Tanzania statistics that in the past ten years agriculture investment has been continuously falling despite its potential. UNESCO National commission of Tanzania (2013) and MKUKUTA Secretariat (2010) evidences this while the country population has been positively growing from years to its current position of 49 million people putting up pressure on demand for more agricultural products. The falling trend on agriculture sector calls for researchers to investigate on why the agricultural investment is falling despite the abundant of natural resources like Gold export potential, gas, Iron ole, best tourism attractions, fertile land, water, lakes, river and others. In this study, the researcher shall focus on gold production and export and investigate on how gold export can

account for agricultural growth, which is now falling, and it is where majority of the poor people are engaged with the agricultural activities.

Tanzania is the third producer of gold in Africa after South Africa and Ghana (FESS 2010) and ranked Tanzania as 15th gold producer in the world therefore the need for gold to account for agricultural growth is important and must be explored. The results obtained from gold export will be used as inference point for other natural resources to account for inclusive growth and poverty alleviation.

1.1 General Background Information

1.1.1 Agriculture Sector Development in Tanzania

(Robert and Jabara 1988) point out that economic growth is commonly measured by national income accounting .National income is the gross amount of merchandises and services created or consumed in a country. Among the main goods produced in the country are the agricultural products like maize, wheat, rice etc. and services like banking services, insurance, etc. that contribute to the growth of GDP, in other words, underdeveloped economy where service sector is poor, economy cannot grow without increase in agriculture investment This demonstrates that the domestic economy cannot grow without increase in agricultural investment. In this case the significance of agriculture should not be ignored in promoting economic growth mainly to the poor country like Tanzania where agriculture is the paramount.

The agriculture sector employs about 80% of the population in Tanzania and contributing to national income as analyzed by (Kavishe 1993) who concluded that major economic activity in Tanzania is Agriculture, contributing 50% of the country income, three fourths of goods sold to other countries and is the core source of food. The author also added that agriculture sector provides inputs for small scale industries which are then used to produce varieties of goods and services.

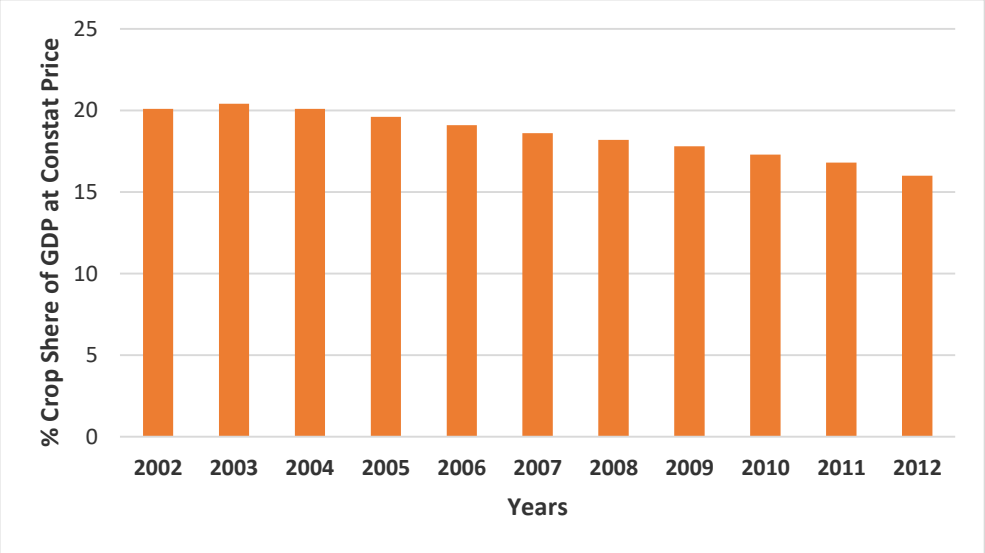
The above analysis evidence that increasing the agricultural production has a direct link to economic development and poverty alleviation. This will depend on

how natural resources can be utilized to account for agricultural development in the country. The utilization of natural resources includes utilization of water resources (Ground Water and underground water), Lakes, rivers, Irrigation system, technology and energy sources for poverty eradication in Tanzania where these resources are claimed to be abundant that if well utilized could alleviate poverty in the country and improve income at household level. Gold export alone could be used to account for agricultural growth hence poverty alleviation. The more we increase investment through agriculture the less poverty hence alleviation.

With regard to agriculture in the country, the sector is less performing and resources around the sector is not utilized fully to increase agricultural output in Tanzania. Among the reasons for this downfalls of the agricultural investment is stipulated to be poor agricultural inputs and technology.

This is also observed in the national data that the share of agriculture excluding hunting and forest has been decreasing with the highest record of 20.10% in 2003 as shown in the figure 1.1 below. The sector has been continuously falling reaching its lowest level of 16.5% in 2012. The trend by agriculture crops is also shown here below:

Figure 1.1 Agriculture Crops Share of GDP

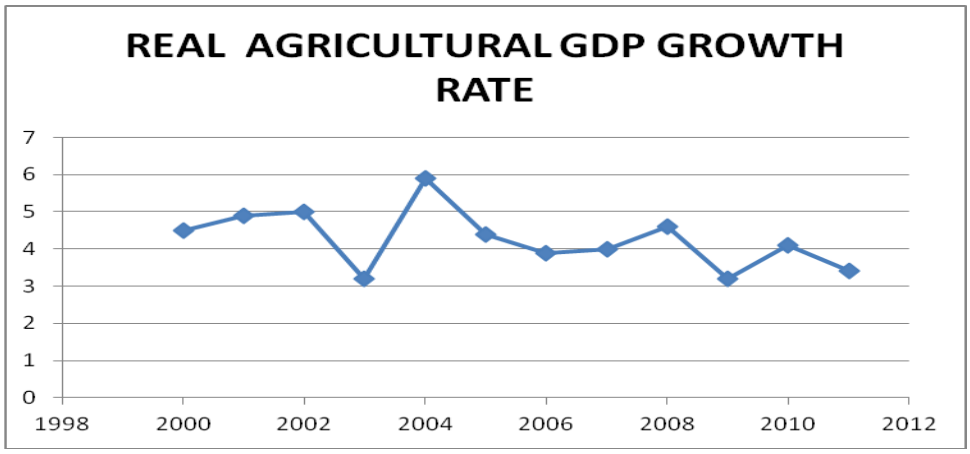


Source: Ministry of Finance Tanzania (2013)

The figure above reveals that agriculture crops share of GDP has been continuously falling from 20.10% in 2004 and 19.60% in 2005 then went further falling to 19.10 in 2006, 18.60% in 2007, 18.20% in 2008, 17.80% in 2009, 17.30% in 2010 and reaching the lowest level of 16.50% in 2012.This downfall to a nation like Tanzania do not give good signal for the future and citizens as whole where food hunger and social crisis is going to be a mainstay in Tanzania when the falling trend continue.

Several issues for underperforming of the sector is also revealed by (Endrew .2008),that the agriculture sector remains dominated by self-sustaining smallholders and the sector has grown poorly performed and transformation on the agriculture sector has been difficult to attract more productivity and commercialization.

Figure 1.2 Real Agricultural GDP Growth Rate



Source: Trading Economics(2014)

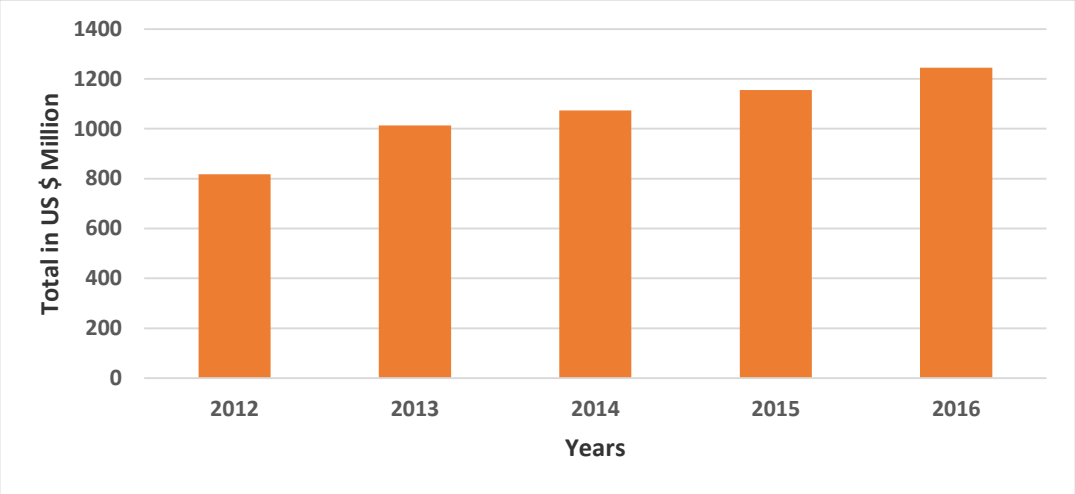
The above figure demonstrate that the real agricultural GDP growth rate has been growing from the initial level of 4.5% in the year 2000 and reaches its maximum growth of 5% per annum in 2002 and fell to the lowest level of 3.2% in 2009 and reaches 3.4% in 2011.This fluctuation is may be contributed with lower output per farm produce in those years and financing from goverment.The annual growth in griculture was supposed to be at least 6% annual growth in agriculture but Tanzania has been falling behind this target.

The impact of continue falling of agricultural production and growth to a poor nation like Tanzania where agriculture is the primary sector of the economy should not be underestimated. This fall will lead to mass starvation, hunger,unemployment,food insecurity and more poverty and crisis in the country. Efforts must be done to uncover the falling trend and strategy to growth must be used to support the growth of the agriculture sector.Therefore this calls for the researcher to examine on how gold export revenue can account for agricultural growth.Gold is identified to be a valuable resource and abudant in deposits with high world market price and demand that call for Tanzania to use this potential through developing policies and strategies.

There are several financing plan that are set by the government of Tanzania in financing the agriculture sector but it fails to reach the target to modernise the sector depite the gold stock and gold export revenue that are not ploughed back to this important sector of the economy in the country. The financing plan is also analysed in the TAFSIP.

The figure below demonstrate the Tanzania Agricultural Food Security and investment Plan for the period of five years from 2012 as a financing proposal to revolutionize agriculture in Tanzania so as to achieve the desired agricultural growth rate of 6%. The total amount required for this target was US $ 5,305 Million for all five years with the initial requirement in 2012 of US $ 818 Million .In 2013 the amount required for this development in agriculture was only US $ 1,013 Million and in 2014 was US $ 1073 Million with the maximum of US $ 1245 Million in 2016.The amount was expected to be used in irrigation development, production and commercialization, rural infrastructure market access and trade and food and nutrition security.

Figure 1. 3 TAFSIP Total in US $ Million

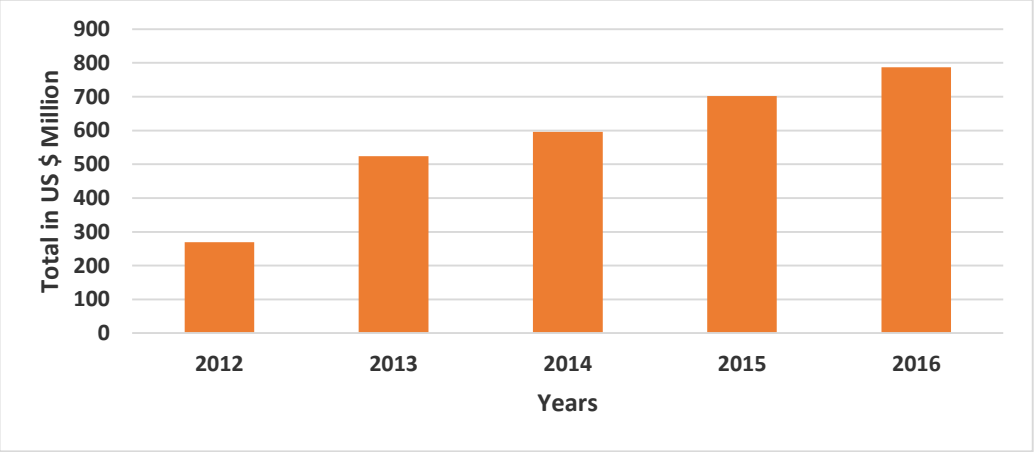


Source: Ministry of Agriculture Food Security and Cooperatives of Mainland Tanzania and the Ministry of Agriculture and natural Resources of the Revolutionary Government of Zanzibar (2012)

Furthermore the following figure below reveals the financing gap as pointed out by the Ministry of Agriculture Food Security and Cooperatives of Mainland Tanzania and the Ministry of Agriculture and natural Resources of the Revolutionary Government of Zanzibar (2012)

Again the figure below shows that the Tanzania agriculture food security and investment plan(TAFSIP) had a clear vision to uplift the agriculture sector but it fell short of financing during the named period with a total financing gap was US $ 2877Million required to improve the sector. In 2012 alone only US $ 269 million was required, 2013 was US $ 524 million, 2014 was US $ 596 million was required. Gold export could have accounted for all these. The country fails to appreciate the role of gold in agricultural development and poverty alleviations.

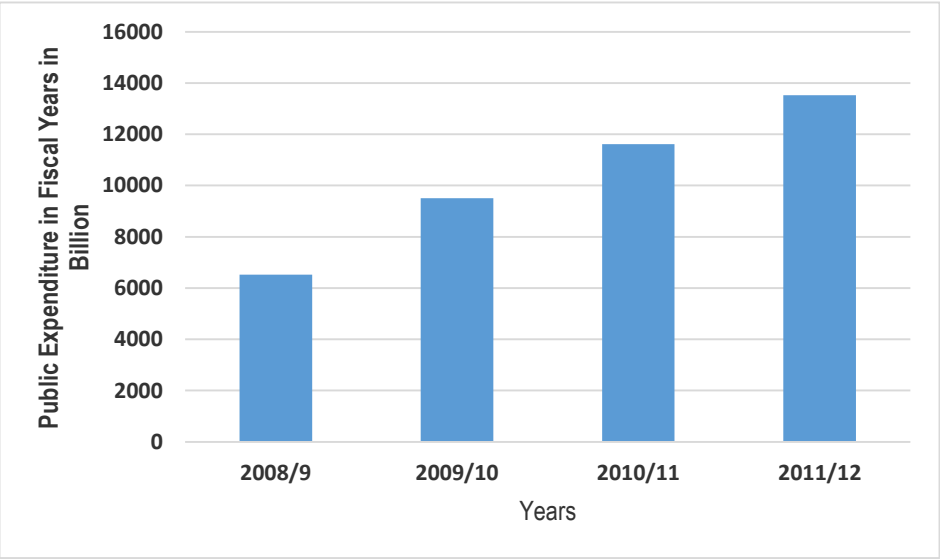
Figure 1:4 TAFSIP Agriculture Financing Gap US $ Million



Source: Ministry of Agriculture Food Security and Cooperatives of Mainland Tanzania and the Ministry of Agriculture and natural Resources of the Revolutionary Government of Zanzibar (2012)

This is also added by Ministry of Agriculture Food Security and Cooperatives of Mainland Tanzania and the Ministry of Agriculture and natural Resources of the Revolutionary Government of Zanzibar (2012) as shown here below;

Figure 1.5 Tanzania National Budget 2008/9-2011/12 in Billion Tsh



Source: United Republic of Tanzania, Ministry of Agriculture Food Security and Cooperatives of Mainland Tanzania and the Ministry of Agriculture and natural Resources of the Revolutionary Government of Zanzibar (2012)

Above figure indicate the annual national budget for Tanzania shillings with public expenditure in fiscal years 2008/9 to 2011-12. It shows that the budget for the year 2008-9 was 6522 Billion but only 3.95% of agriculture expenditure was allocated by the government. In 2009-10 the national budget was 9509 billion but only 3.58% of agriculture expenditure was allocated. Furthermore in 2010-11 national budget with public expenditure of 11609 billion only 3.04% of agriculture expenditure was allocated for agriculture while in 2011-12 the national budget was 13526 billion but 6.8% of agriculture expenditure was allocated for agriculture. This reveals again that there is lower capacity of the state to prioritize agriculture and financing has become the major problem facing the nation despite the gold stock and gold export. The country resort into borrowing from the IMF and World Bank with high interest rate.

The poor capacity of the state in increasing the agricultural expenditure is also reflected in the Maputo declaration that require all African countries including Tanzania to allocate 10% of public expenditure into agricultural productivity NEPAD (2003). Tanzania has been allocating less the amount and failing to reach the Maputo declaration targets in agriculture and this is poor commitment by the government to farmers to a country where there is gold production and export. It is a lost opportunity to farmers that if gold was well taped the government could have better capacity and position to support farmers. This matter needs to be investigated to examine the role of gold export in agricultural development and poverty alleviation. As pointed in the Malabo Declaration on Accelerated agricultural growth and transformation for shared prosperity and improved livelihood under the African Union (2014) reveals that the only way for countries to develop in Africa is through agricultural led growth as the important strategy growth to be implemented and therefore the need to examine gold export for this contribution is necessary to Tanzania because agriculture in Tanzania occupy 80% of the work force and most of them lives in rural areas. This means supporting agricultural growth through the use of gold export revenue means poverty alleviation among people in Tanzania and this is in line with NEPAD policies of agriculture target for 2025.

1.1.2 Key Agricultural Crops Grown in Tanzania

There are different agricultural crops that are produced in Tanzania, includes the following products shown here below:

Table 1.1 List of Main Crops Grown in Tanzania

	Maize	Tea	Sorghum
	Rice	Tobacco	Vegetables
	Wheat	Sisal	Beans
	Banana	Cotton	
	Coffee	Potatoes	
	Millet	Cassava	
	Sugar cane	Coconut	

1.1.3 Application of Agricultural Technology and Machines

Ministry of agriculture (2011) describes that peasants are the largest group of farmers each owning an average of half an acre to two acres. The same report outlined that 70% of all farmers use hand hoe for farming activities, 20% are using ox plough and remaining percentage use tractors. This is also revealed by (Shapiro and Michael 2010) as shown in the following table

Table 1.2 Technology Used in Cultivating Crops

Cultivation and Scales	Current Capacity and Practice
Hand Hoe	70%
Oxen Plough	20%
Tractors	10%

Source: (Shapiro and Michael 2010)

As indicated on the above table that majority of Tanzania farmers use Hand hoe as a way of producing crops like rice, Maize and other farm product representing 70% of the technology used in farming. Therefore this demonstrates that farming in Tanzania is also less efficient to absorb hectares of Arable Land 44 million.

This calls for the government, individual and policy makers to examine the mechanism on how agricultural sector should be supported to a country where there is gold export and abundance of other natural resources that could be used to support the growth of the agricultural sector.

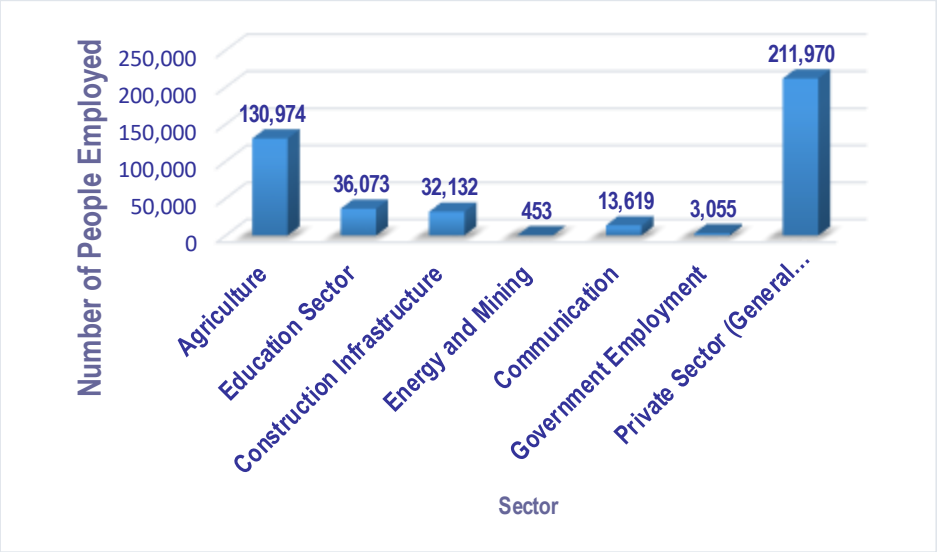
It is again revealed by Festo (1993), that given the largest available arable land in Tanzania mainland, the country has huge potentials in all of sub-Sahara Africa where 45% of the mainland is suitable for farming activities through the rain season. Remarkably, this is also revealed by (Feed the future, 2011), that despite all these resources, Tanzania is among the net importer of agricultural product like rice. This is linked to the low capacity to utilize land for rice production and water for irrigation to help improve agricultural production and poverty alleviation.

1.1.4 Agricultural Growth for Poverty Alleviation

Much literature appreciates the role of agriculture in poverty alleviation this is also evidenced by the World Bank various reports, African Bank report and Tanzania ministries reports that agriculture has significant role to play in the country. The Ministry of Agriculture Food Security and Cooperatives (2013) evidence that in Tanzania, agriculture is the main back bone of the economy contributing to about 24.1% of GDP 30% of export and employ more than 75% of the total work force in the country, food and cash crops alone account of 70% of rural incomes and therefore it is very important sector in alleviating poverty.

According to the Ministry of Finance and Planning (2015) on their national speech by the minister of finance hon. Saada Mkuya (MP) revealed that agriculture is still the key employer for the workforce in Tanzania as demonstrated in the following figure;

Figure 1.6 Numbers of New Jobs Created by April 2014



Source: Ministry of Finance and Planning (2015)

It is acknowledged and discovered that until April 2014 a total of 630,616 new jobs were created in the public and private sector and agriculture was still a leading sector in new job creation to Tanzania by creating 130,974 new jobs in 2014 alone compared to any other sector of the economy. Therefore this provide evidence that the agriculture sector has to be improved despite the downfalls of the agriculture sector, since is the major source of job creation, income and livelihood among Tanzanians compared to any other sector of the economy. The more we address the problems in the agriculture sector the more we alleviate poverty in the country. It is believed that income poverty and food poverty shall be defeated once there is increase in the agricultural investment.

Despite of acknowledging the significance of the sector in poverty alleviation the Ministry of Agriculture Food Security and Cooperatives point out that financing of the agricultural sector has been the major constraint towards developing the agriculture sector. Therefore the researcher of this study investigated on the role of agricultural development in poverty alleviation in Tanzania. Gold is deposit and export is abundant in Tanzania and it must assist in accounting for agricultural growth and poverty alleviation.

The researcher believes that poverty alleviation will be enhanced if the agriculture sector is developed given its potential of the sector to the country. The researcher will examine role of gold export in agricultural development and poverty alleviation in Tanzania. New policies will be developed to enhance the agriculture sector and economic growth as a whole.

1.2 Brief history of Mining and Policies in Tanzania

According to Tanzania chamber of Mineral and Energy (2017) provides the history of mining in Tanzania and explain that the "history is unfolded from the pre-colonial time when Arabs and other local traders mined and sold the natural resources including copper, gold, Iron and salt. Mining started around 1890's in Lake Victoria during the period of Germany administration in Tanzania in 1884-1918. It is revealed by the TCME that in 1920-1930 British and South African company opened a diamond mining field in Mwadui Shinyanga. Following the independence in 1961 it is further pointed out that the government decided to privatize all the mines and were held in the hands of the public where National Development Corporation (NDC) and STAMICO public owned, took control of major mines". The period after independence Tanzania passed several reforms as analyzed by Butler(2004), that "until during 1986 where the country adopted the IMF and world Bank policies under the popular reforms namely structural Adjustment Programmes (SAPS) and government decided introduce privatization and trade liberalization reforms in the country. In 1990 the government established Tanzania Investment Promotion Center and through this center and reforms encouraged many multinational to come in the country for mining activities and many of them engaged into gold production activities." Staring from the year 1997 and 1998 mining policies were introduced in the country to manage mining sector followed by the mining act 2010. Several reforms on mining are underway see other followed sections in this report for more information on mining policies. The mining policies in Tanzania as said earlier was under the influence of the IMF and World Bank in trying to shape the African continent and Tanzania as well that falls with a lot of criticism regarding the policies. That is why Campbell(2003) whose focus on mining governance analyses mining in Africa especially the Sub-Saharan Africa that the mining

sector fall short of poor good governance among the companies, corruption and rent seeking behavior and not benefiting the poor. The author pointed out that with mining sector it require new defined reforms on the role of the government in controlling mines. The author is appreciated for pointing out the mining in general perspectives but the author appear to be too qualitative without any empirical evidence on the analysis. Mining in Africa and Tanzania is dominated by the multinational companies starting from coal mining, gas, oil, diamond, Iron, gold etc .Companies are protected by the state through the policies that favor the multinational companies to mushroom in the mining sector and extract resources. Today the multinational engaged in mining the even tend to threaten the government because of mineral right given to them. Lange (2008), they conflict, threaten local people and villagers because of mineral therefore the more reforms by the government must be derived to ensure local people enjoy the most from mines. See the chapter for the national dialogue by the president on gold concentrate in Tanzania to examine the feelings of the current president.

1.2.1 Gold and Other Natural Resources

Mwaitete (2014) pointed out that natural resources available in Tanzania when mapped properly can help reduce poverty in the country. It is also revealed with MKUKUTA Secretariat (2010(a)) highlight that the country is bestowed with numerous water sources ranging from seas to aquifers and shared water bodies. Productive activities consume about six percent of the available water indicating a huge potential for investment which can be used to boost the nation's economy. Such huge availability of water resources has not been translated into irrigation farming, leaving majority of population poor and not being able to meet their basic needs. It is also added by (MKUKUTA Secretariat 2010(b)) that "Tanzania is blessed with numerous magnificent tourist attractions ranging from trekking through game hunting to canoeing; all being used as sources of income to the nation and hence contributing to economic progression"

Also TANSERVE (2008) and (Mwaitete 2014(b)), a study conducted showed Tanzania has vast supplies in mineral resources like phosphate, limestone, iron ore, gypsum, coal, diamond, nickel, copper, gold and Tanzanite. Among these

mentioned resources, nickel leads by having a total of 209 million tons, Iron ore at 103 million tons, diamond at 50.9 million carats, copper at 13.7 million tons and lastly is gold at 2222 tons. Not only these mineral resources, Tanzania has abundant of gas and if well taped could be used to assist farmers with a good sources of energy and other agricultural activities hence growth and poverty alleviation. It is in the mind of the researcher that when right strategy is applied then resources can be valued to examine its potential. Resources like gold if well mapped can very much improve the economy and reduce poverty (Mwaitete 2014(c)) especially through more taxes revenue on gold can be ploughed back to the agriculture sector therefore researcher observe that there is a need for Tanzania to turn their plan into Gold export revenue and use it effectively before the depletion date to account for agricultural growth where majority of the poor lies.

1.2.2 Gold Value Concept

Gold is money and valuable and can be used and recognized for the settlement of all payments. Gold is a national survivors and this is reflected in the World Bank as Gold reserves. The reserve of so many countries is kept in the form of Gold and those countries with higher Gold reserve have the very high opportunity for developing their country given the reserve amount kept. Gold reserves is also reflected in the financial statement of the World Bank and the IMF. The higher the reserve kept by the individuals, companies, or country the better future and prosperity of their nations. Stability of Gold price and value calls for Gold reserve rather than currency reserve. In Tanzania, Gold export is mainly dominated by the foreign companies who benefit more than the local people. Government, commercial Banks individuals and companies hold Gold so that it can assist them from economic crisis, inflation and any uncertainties.

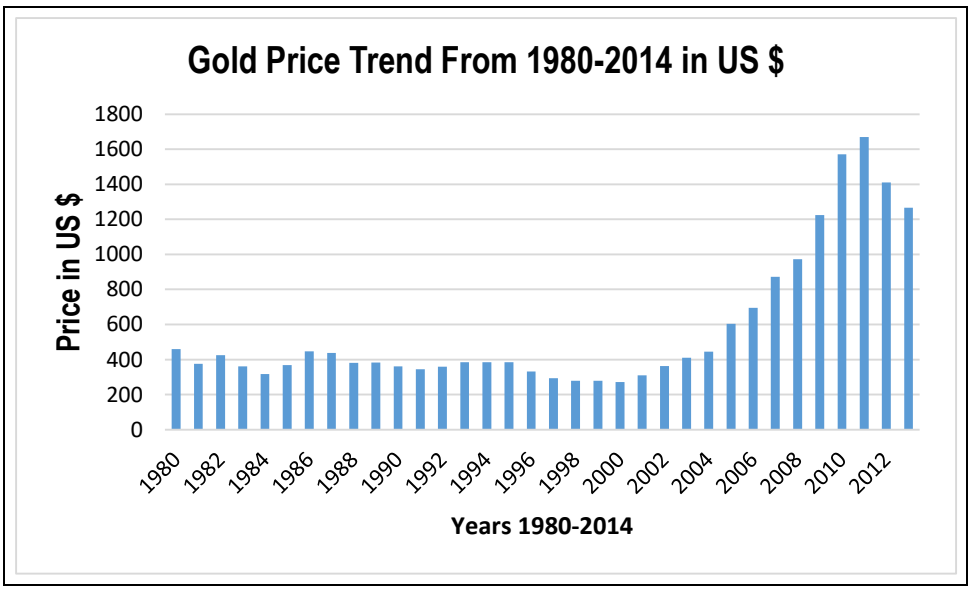
USGS (2013) evidence that Gold has been a great treasure since old times to date despite of being highly demanded for beauty but also is used for essential industrial metal. It is again added by the author that “Gold performs critical functions in computers, communications equipment, spacecraft, jet aircraft engines, and a host of other products. Although gold is important to industry and

the arts, it also retains a unique status among all commodities as a long-term store of value. Until recent times, it was considered essentially a monetary". Since gold is identified to be valuable and money by itself the researcher examined the role of gold export in agricultural development and poverty alleviation in Tanzania. New policies have been developed to enhance the agriculture sector and economic growth as a whole in Tanzania.

1.2.3 Gold Demand and Price

The demand for Gold in the world has been growing among nations World Gold Council (2016) and KITCO (2016) reveals the trend and evidencing that the Gold Market have risen and stable over the years. The Gold demand increase, is reflected by the central banks, investors, jewelers and technology industries. As it has been mentioned in the literature that Gold provide a stable way for people and government as a store of value and hedge against future currency fluctuations therefore the demand for gold always high.

Figure 1.7 Gold Price Trend



Source: Statista (2016)

The above figure demonstrates the price of Gold per ounce of US $ produced from 1980 to 2014 Statista (2016). The figure shows that the price of Gold has been positively increasing despite its fluctuations but stable from its initial of US $ 613 in 1980 and slightly fell in the following years reaching us $ 385.51 per

ounce in 1990 to its maximum level of US $ 1668.98 in 2012 again slightly fell but not significant fall to US $ 1266.4 in 2014. Gold price is stable and promising given the study period. The trend in Gold price is suggested to be strong throughout years and given the scenario where Tanzania has Gold stock can benefit more to improve welfare of the people if mapped strategically with right policies that are pro-poor especially through utilizing gold revenue to improve the agriculture sector also this acknowledged by (Mwaitete 2014) and (Mwaitete and Rastogi 2016). In general Tanzania has benefited less from gold price and trend that calls for critical investigation. Therefore this study is about the role of gold export in agricultural development and poverty alleviation in Tanzania.

1.2.4 Gold Production History in Tanzania

The brief history of Gold start from the German colonial period, beginning with gold discoveries in the Lake Victoria region in 1894. Mining began at the Sekenke Mine in 1909. After 1930, gold production was substantial and increased steadily until World War II. By 1967, the gold industry had declined to insignificance. This fall was linked to the Arusha declaration where the government took control of gold production in the country and started it production again after 1974 to 75 when the world gold price increased greatly. Beginning in April 1990, the Bank of Tanzania began buying gold at the world market price through commercial banks, paying miners in Tanzanian shillings calculated at the parallel market rate for the US dollar rather than at the official rate. In the late 1990's, several mining companies from Canada, United Kingdom, Australia and South Africa arrived in Tanzania, interested in gold exploration and development. From 2000, production of gold at an industrial scale is growing, especially from the Geita (AngloGold/Ashanti) and Bulyanhulu (Barrick) mines Euroamerican Data(2006).This reveals that the increase in production scale by companies was due to the adoption of structural adjustment programme (SAP) that favored the flourish of multinational companies to engage into massive production of gold stock.It is was the IMF and World Bank policies that promoted gold production in Tanzania.

To date Tanzania is among the African's gold producer that include countries like South Africa, Ghana, Mali and Tanzania. Data suggest that there is a significant amount of gold deposit in Tanzania that needs to be used for poverty alleviation. This is again evidenced by Euroamerican Data(2006) and FESS(2010), that Tanzania has become one of the fastest emerging gold producers in Africa, and is now the contient's third-largest gold-producing country after South Africa and Ghana. It is estimated that the country has more than 2,222 tons of Gold deposits and reserve (Presidential Mining Review Report ,2008). But Gold exploitation is mainly dominated by foreign giant corporate firms that enjoy maximum production and revenue with tax relief and incentive packages given by the government.

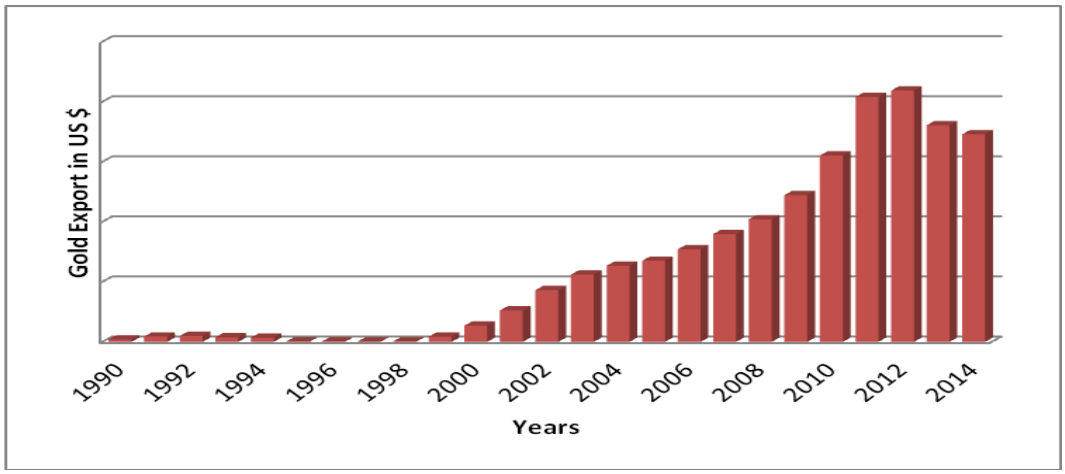
Given good business climate and environment with revenues yield by these gold giant producers in Tanzania it as revealed by (Euroamerican Data,2006), in each year since 1998 a new gold mine has been opened in Tanzania some are owned by Resolute Ltd, Ashanti Gold field, Barrick Gold Corporation, Meremeta Ltd etc.

1.2.5 Gold Export

Gold export from Tanzania has been continuously increasing but mainly dominated by the multinational companies who have great benefit than the local economy. The following data reveals the gold export trend from Tanzania from the year 2000 and 2013.

As revealed below by (Mwaitete and Rastogi 2016) that in 1990 gold export brought about US $ 20,257,938 and has been positively growing with its highest level of US $ 2,093,294,465 in the year 2012 then slightly fell in the years 2013 to 2014 but not significant fall reaching the level of US $ 1,729,807,293 and US $ 1,804,633,295 respectively. Gold export in Tanzania has mainly been dominated by larger foreign firms that contribute to our export given the shrinking value of our primary products Gold export is performing wonders in Tanzania.

Figure 1.8 Tanzania Gold Export 1990-2014



Source: (Mwaitete and Rastogi 2016)

It is the same gold export that is exempted from value added tax (VAT) and export taxes while is a good source of export earnings that account almost 36% of our total export. Therefore gold has to account for agricultural development and poverty alleviation if we are to be proud with gold stock and alleviate poverty.

Similar growth trend is also recorded for the GDP growth rate in Tanzania in parallel with Gold export as shown here below:

Figure 1.9 Tanzania Gross Domestic Product(GDP)

Source: World Bank (2015)

It is revealed that the GDP growth rate was 4.9 in the year 2000 and went on increasing and reached its peak of 7.8 in 2004 and slightly fell in 2005 where it grew at a rate of 7.4 in 2005 and it further continued to fall in 2006 but stable. It further improved in 2007 at the rate of 7.1%.In 2008 the GDP rate was 7.4% much better than 2007. In average GDP rate has been growing at almost 7% throughout the period until 2013.Indicating stable economy. Among the main contributing to stability in GDP growth rate in Tanzania is the mining industry and growth of construction and communication services in urban and rural areas.

Generally, the GDP rate in Tanzania is very impressive indicating a stable economy. (World Bank2014) reveals that "in 2012 alone, Tanzania its average per capita income stood at $570, placing it in the 176th position out of 191 countries in the world therefore is among the poorest country of the world. Even by the most optimistic poverty estimates, there are still approximately 12 million poor people living in Tanzania, which is approximately the same number as in 2001".

1.2.6 Current Giant Firms Involved in Gold Mining Resources in Tanzania

According to Bomani M. (2008), explain that "Between 1994 and 2007, six mining contracts were signed for big gold mines. Mines with those contracts identified by the author are:

(a) Bulyanhulu in Kahama – owned by Bulyanhulu Gold Mine Limited. Contract signed on 5th August 1994;
(b) Golden Pride in Nzega – owned by Resolute Tanzania Limited. Contract signed on 25th June 1997;
(c) Geita Gold Mine in Geita – owned by Anglogold-Ashanti from South Africa. Contract signed on 24th June 1999;
(d) North Mara in Tarime – owned by North Mara Mine Limited. Contract was signed on 24th June 1999;
(e) Tulawaka in Biharamulo – owned by Northern Mining and Pangea Minerals Ltd. Contract signed on 29th December 2003; and

(f) Buzwagi in Kahama – owned by Pangea Minerals Limited. Contract signed on 17 February 2007."

All the these companies pointed are the key gold producer and export

Keeler (2009) point out that "Six expansive gold mines are in charge of a significant part of the nation's creation. Barrick Gold, the world's biggest gold mineworker, runs Tanzania's biggest mine, Bulyanhulu, with 12m ounces in gold stores. Barrick likewise own Buzwagi (3.3m ounces) and North Mara (3m ounces), and keep up a 70% stake in Tulawaka (80,000 ounces). Old English Gold Ashanti (AGA) work Geita (5.1m ounces), and Resolute Mining Ltd own Golden Pride (2.5m ounces). These organizations have yet to pay corporate salary charges as a result of capital remittances and other assessment exceptions under current enactment. Be that as it may, general commitments for mining as of now make up around 4% of government expense income (around USD100m a year), and generation represents 3.5% of GDP."

1.3 Statement of the Problem

Studies shows that agriculture provides an effective means of alleviating poverty and improving the economy especially developing nation like Tanzania the sector is still significant as evidenced by African Development Bank(2004) and Raymond M and Malit E(2010). But it is observed that investment in agriculture sector is not performing to the expected level of performance generally the share of agriculture has been falling from the past ten years despite the abundance of natural resources like water resources, Gold, Gas, fertile land etc. that could be used to support the sector. Initial indication is that agriculture sector has contributed little to poverty alleviation hence call for investigation. Furthermore, the agriculture sector employ more than 80% of the work force living in Tanzania and majority of them are the rural people and therefore the sector is very important in the economy since it is poverty inclusive.

Again it is added that in the past ten years statistics shows that GDP growth rate has been tremendously growing to its constant level of 7% per annum but this growth has not been poverty inclusive since the agriculture sector has been

falling. A path to utilize other natural resource like gold resources to account for agriculture growth is significant to the poor nation like Tanzania where majority of the poor are engaged in the agricultural activities hence utilization of gold export becomes necessary which is claimed to be abundant in the country.

The analysis from literature reveals that the continued world economic crisis has made these giant companies to turn their interest into Africa particular in the exploitation of natural resources and gold is one of the key targeted resource to help recovery of the foreign economy under economic crisis. Given this fact and significance of Gold, Tanzania should also consider on how gold export can be used to account for agriculture and poverty alleviation.

Therefore given the potential role of gold export to the world, the need arises for gold export to account for agricultural growth in general and specific to maize production (as a major crop contributing in economic growth) and poverty alleviation as an important factor and must be investigated. The results obtained from gold export can be used as inference point for other natural resources to account for inclusive growth and poverty alleviation to Tanzania and Africa as a whole.

1.4 Objective of the Study

1.4.1 General Objective

The main objective of this research was to examine critically on the role of Gold export in agricultural development and poverty alleviation in Tanzania.

1. 4.2 Specific Objectives

- To know the amount of gold stock and trend in export in Tanzania
- To explore on how Gold export can account for agriculture productivity
- To examine the influence of gold export (growth rate) on economic growth (gross domestic product growth rate) of Tanzania
- To find out whether gold is significant for poverty alleviation in Tanzania through agricultural growth or not

- To investigates whether granger causality exist between Gross Domestic Product Growth Rate and Gold Production Growth Rate in Tanzania
- To find out whether cointegration between Gross Domestic Product Growth Rate and Gold Production Growth Rate exist in Tanzania
- To explore on the long run and short run causality Gross Domestic Product Growth Rate and Gold Production Growth Rate in Tanzania.
- To investigate whether the value of gold is known to the public or not
- To explore the involvement of multinational companies in gold export in Tanzania.
- To examine whether current farm investment in maize is technically feasible, viable investment or not
- To find out the need for gold revenue to account for agriculture investment
- To investigate and examine farmers constraints in agriculture.
- To formulate policy that will be useful to policy makers regarding Gold export for poverty alleviation.
- To find out the implication for the other natural resources as well

1.5 Research Hypotheses

Tanzania is considered to be among the poor nation of the world despite larger deposits of key natural resources like gold that have potential in agricultural development and alleviating poverty. The researcher would like to test the following key hypotheses;

- Gold export does not contribute in agriculture productivity in Tanzania
- Gold export does not cause any change in poverty alleviation
- Gold export does not contributes in economic growth of Tanzania
- The awareness of the value of gold is known to the people of Tanzania.
- Farm investment in maize(Main agriculture product in Tanzania) is feasible and viable

1.6 Scope of the Study

This research covered both qualitative and quantitative research. Reasons for using both methods qualitative and quantitative approach is because of

complexity of the problems under investigation to be well informed to informants given the stock of gold alone and the state of agriculture and farm condition.

Under qualitative research (questionnaires, interview, discussions and observations) it includes a pilot survey on areas where there agricultural production activities (maize producing areas) and places of high valued natural resources like Gold production in Tanzania(Mainly Chunya in Mbeya regiona). The choice of maize is that it is the main food staple in the country and has significant impact on food security, income and domestic economy. The following were the location visited by the researcher:

One ward namely Mbulumbulu at Kambi Ya Simba village of Karatu district in Arusha region, Two wards of Mbulu district namely Bargish ants and Moringa of Manyara region located on the Northern of Tanzania. The selected districts is based on the practice they are among the key producer of maize from the northern zone of Tanzania. The researcher visited individual farmers in the areas and examined the agricultural viability on cost and benefits of current farm investment and investigate other farm constraints to reveal the gap that gold stock, production and export can account for agricultural development.

The gold producing area of Chunya district in Mbeya was also be visited to explore the Gold export and its potential to the economy. Other professionals from Arusha district of (Lemala and Engutoto wards) were visited to examine their opinion on potential role of gold export and its benefit to the economy.

Also the researcher applied quantitative technique through collecting and using secondary data for agriculture development, gold production and gold export and economic growth. The researcher believed that gold is one of the high valued natural resource that can easily be used as money and Tanzania is listed as among the key gold producers in Africa after South Africa and Ghana. Gold was used as the one of the key natural resource that can play a central role in economic growth and reverse the current falling trend in agricultural development. Data obtained from secondary sources provided key steps for developing regression, conducting granger test and co-integration estimating short run and long run causality. All the derived results were examined and used for policy

recommendation and provide opinion to improve the agriculture sector through gold export hence poverty alleviation.

For this purposes, time series data obtained from secondary sources covering the period 1990 to 2014 were used to make projections and analysis. Different journal and publications from government ministries responsible for agriculture and cooperative, energy and minerals, natural resources and finance and economic affairs, World Bank reports and statistics were used to make analysis and decision regarding policy choice for the role of gold in agricultural development and poverty alleviation.

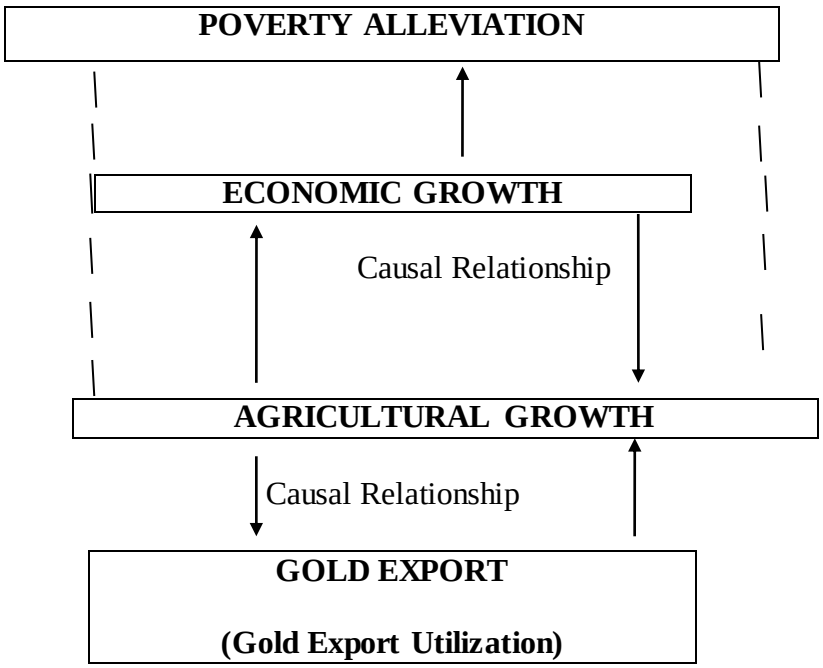
1.7 Limitations of the Study

- Resources and Time constraint: Researcher had limited funding to conduct the study and prompted him to use his personal funding to collect data timely with a limited available resource and making the study useful and timely.
- Some data were very limited to find locally but the research found data internationally and sometimes used proxy indicator like annual poverty rate were not available then the researcher applied per capita income as proxy indicator to annual poverty alleviation rate given the time series data 1990-2014.
- Changes of research supervisors affect the research expectation and end results of the study
- New Changes in the government regulations that require all government employee travelling abroad must get permission to travel from the president office and the ministry with limited time to travel and funding.
- Many farmer had no proper records of their income and expenditure of maize farm investment

1.8 Conceptual Framework

The Role of Gold Export in Agricultural Development and Poverty Alleviation:

Figure 1.10 Conceptual Framework



The above figure 1.10 is a conceptual framework of the role of Gold export in Agricultural development and poverty alleviation in Tanzania. Tanzania has significant amount of Gold and other natural resources but still ranked the 176th poorest countries in the world and many statistics shows that the agriculture sector is falling that has employed more than 80% of the work force and it is in this sector where many poor people are engaged with. Again, in the past ten years, the country experienced with higher economic growth rate but the economic growth rate has not been poverty inclusive and this calls for investigation to Tanzania where there is Gold deposits and other natural resources still claimed to be among the poor.

Gold production and export is one of the key resource, if well mapped out and utilized could then help improve the economic growth through using its surplus generated to finance the agricultural sector that could then help in poverty alleviation in the country. Current statistics shows that the agriculture sector is falling steadily throughout from 2000 to 2014. The researcher realizes that there

is a need to reverse this trend in making sure that more effort is done to improve the agriculture sector that employ more that 80% of the work force in Tanzania and any policy strategy to improve the agriculture sector means poverty alleviation in Tanzania. The researcher will investigate causal association between economic progression and agricultural productivity and growth also economic progression and Gold export to investigate the current trend and effects on the variables. Based on these relationships researcher will come up with policies and strategy that could assist in utilizing gold and other natural resources to account for agricultural development and poverty alleviation. The researcher shall use time series data covering the period 24 years from 1990-2014 see the research methodology for further analysis on how data will be collected and analyzed.

1.9 Definition of Terms

1.9.1 Natural Resources

These are resources that are given by nature and can be used to create wealth Investors World (2014).They includes resources like Gold, Uranium, Water, Tanzanite, Gas, Water, River, Lakes, Ocean, Coal, Land and other related resources. These natural resources appear to be abundant in Tanzania.

1.9.2 Farm Resources

In this study Farm Resources includes all farm related production from water resources, Ground Water and underground water, Lakes, rivers, Irrigation system, technology and energy sources.

1.9.4 Non-Farm Resource

Nonfarm resources in this study includes minerals like Oil, Gas, Tanzanite, Gold, Uranium and other key resources like National parks that are also abundant in Tanzania.

1.9.5 Natural Resource Depletion

Life of earth (2013), Define resource diminution as an economic concept denoting the over-consumption of raw materials within a region. Natural resources can be classified either as renewable or non-renewable. When such

resources are consumed faster than they can be replenished then that is considered as natural resources depletion.

1.9.6 Natural Resource Management

Natural Resources Management (NRM) refers to the sustainable consumption of the resources that are occurring naturally such as minerals, water, land, and all sorts of flora and fauna. In principle, all human activities (economic and non-economic) are held together by the natural resources Jan B. (2000)

1.9.7 Poverty Eradication

In this context of this study means getting rid of poverty in Tanzania and improved farmers production and techniques, improved public services like health education and infrastructure's. People having reasonable income with basic necessities like food shelter and clothing with less poverty in the community are known as poverty eradication.

1.9.8 Food Security

When household has enough food to feed everyone and that food can be accessed with minimum effort; that is termed as food security. The scope can vary from the household level to the nation level.

1.10 Chapterization Schemes

This thesis is presented in the form of chapters and each chapter is guided with objectives and hypotheses with findings and conclusion to be useful to informants regarding the gold production, export and agricultural development for poverty alleviation in Tanzania. There are eleven chapters where chapter one is about introduction and background information. Chapter two is about literature review and comparison with other researchers and literature gap analysis. Chapter three is about Methodology used. Chapter four investigates about gold export and agricultural productivity a granger causality and cointegration. This chapter also reveals on how gold can account for agriculture development as evidenced in the granger causality and propose theory of gold tax push for agricultural development and poverty alleviation. Chapter five examines gold production for export and poverty alleviation using a granger causality. Chapter

six is about gold production growth rate and gross domestic product using a granger causality and cointegration. Chapter seven is about agricultural development and economic growth a granger causality and cointegration. Chapter eight is about the paradox of gold exploitation and export in Tanzania with a qualitative approach. It reveals the level of gold value to Tanzania society using a survey instruments it also examines mining policies critically. Chapter nine captures maize farmer's agricultural development, constraints, profitability and living condition and the significance of agriculture in poverty alleviation. It reveals a gap to be filled with proposed policy on gold export revenue given farm constraints and farmers condition. Chapter ten capture a national dialogue through radio and newspapers of gold concentrate (named gold sand) it captures President of Tanzania feelings on gold concentrate and accountability among government staff and companies. The duration of the national dialogue started on March 2017 to July 2017 with special team for investigation presented their findings that prompted for new mining policies. Chapter eleven is all about general conclusion and policy recommendations and strategies based on the results found in all chapters.

CHAPTER TWO

LITERATURE REVIEW

This chapter assess the interrelationship of what has been done by other scholars in the field related to Gold export and agricultural development for poverty alleviation. The researcher surveyed the existing state of knowledge (theoretical as well as empirical studies).The intended work would contribute to the advancement of knowledge in the context of the problem that is to be solved on the role of gold export in agricultural development and poverty alleviation in Tanzania.

2.1 The Role of Gold Export

Gayathri and Dhanabhakyam (2014) point out that "in India alone gold is termed as the greatest asset and being considered as a safe investment and can be used during the economic crisis and other uncertainties since gold has stable value unlike other investments". The researcher used granger causality and cointegration in an attempt to examine gold price and stock exchange index in India. The author is appreciated by through acknowledging the gold value for Indian economy where the value of gold is known. The author of this researcher will use survey to examine whether the value of gold is known like the way it is in India or not and inform the researcher and decision makers in Tanzania.

The value of gold is also acknowledged by the World Bank and IMF and use as a tool to hedge against future uncertainties. Developed nations have gold reserve in their national banks. It is also revealed by the World Gold Council (2016) on Gold holding the leading country is the United State of America, followed by Germany, IMF and Italy. In the analysis by the world gold council it was observed that none of the African countries is among the 10 countries and their Institution with World Official Gold Holding- reserve and Tanzania is even not mentioned in the list of 100 countries holding a Gold reserve. South Africa is identified in the 29th list and Ghana is identified in the 71st list of the World Official Gold Holding reserve. So the researcher would like to survey in

Tanzania on gold stock and value to the public of which this idea is not revealed to the world gold council and the world Bank analysis and models.

Sindhu (2013) and Elfakhani, Imad and Hind (2009) explain that gold is known from old times of civilization to date where gold demand and value has been growing tremendously. The author revels that even the world financial crisis has driven back for the return of gold standard and therefore the value of gold is significant to the economy. The authors also add that many western banks in England and USA recognize the importance of Gold and is used as a major reserve asset that is why the richest countries have huge reserve of Gold. The authors focus on gold prices and are appreciated on using regression analysis to validate their study regarding the gold price. In his paper Sindhu (2013) focused on gold price and exchange rate in comparison with crude oil price in India and he never examined the gold export. On his methodology the author used regression analysis and correlation covering the period of five years with India perspectives. This researcher is examining the role of gold export in agricultural development and poverty alleviation.

Subhashine and Poornima (2014) also examine the role of gold in investment and is taken as safe investment especially for those who want to speculate for money. The author is appreciated by examining the value of gold that is a good source of income and it can be used to develop other investments. In his study the researchers focused on the empirical investigation of the causal relationship between gold price, exchange rate and crude oil. The methodology used by this researcher was causality and cointegration and concluded that gold is a good investment for those that want to hold money. Based on the above literature it validate that gold stock in Tanzania is the stock of money sitting on the ground and it is wealth that is something of value. Subhashine and Poornima focus their studies in India on gold price, exchange rate and oil price for India by using weekly data from 2009 to 2013. But the authors are appreciated through revealing the significance of gold in the economy. In this study the current researcher is going to examine the role of gold export for agricultural development and poverty alleviation where mix methods and approaches shall be

used including regression, granger causality, cointegration and survey methods so that it becomes more informative to Tanzania and Africa.

It is also added by Rastogi and Mwaitete (2016) that gold as an assets is normally equal to safe heaven and as a medium of exchange. The author's revels that in India society gold has been taken as pride for Indian families and gold is identified as an asset that protect one from financial crisis. In India gold has some cultural image and therefore is very valuable. Gold is used to protect families during inflation times and war times where the value of gold is always stable and promising. The authors emphasize that there are strong reasons for why people hold gold that includes security reasons, Gold has capacity even to maintain its value in times of global crisis, people hold gold to build diversified portfolio and also it is used as collateral and security against loans. Therefore gold is very valuable.

When examining the role of gold export in economic growth Mwaitete (2016) pointed out that "gold export to a larger extent must be ploughed back to domestic economy so that the local economy can improve." The author views on gold export is strongly supported in Tanzania if we are to alleviate poverty before the gold is over, since gold is a depletable resource and its revenue must be used wisely for the betterment of all the people in Tanzania. In his study the researcher applied granger causality and cointegration and found that the variable gold export and gross domestic product are cointegrated and there is short run and long run. The researcher extend his work to examine further on gold production for export and economic growth and furthermore the researcher shall apply gold export and agricultural productivity to establish the causality and conclude about the results on his thesis where mix methods approaches shall be used to explore more on gold revenue.

Based on the study done by Mwaitete and Rastogi (2016), they found that "there is a positive relationship between gold export and gross domestic product in Tanzania and therefore gold is significant to gross domestic product". The authors applied regression analysis to examine this relationship and found that gold export is very significant. They did not consider causality relationship and

mix method approaches of qualitative and quantitative to make the study more informative.

2.2 Gold Export and Agricultural Development

Cartier and Burge(2011), they examined on the role of agriculture and artisan in gold mining with special attention on "productivity and marketing difficulties that are hindering establishment of sustainable livelihood in small scale agriculture in Sierra Leon "The author looked at the farming and mining cycle and they are appreciated by pointing out the key problem facing the agricultural productivity in sierra Leon that including the lack of enough labor to carry out the agricultural activities." But the authors never examined at gold export and agricultural development. Furthermore in their studies appeared to be too qualitative and narrative by nature. They presented analysis without data. The current researcher of this study will apply time series data to evidence gold export.

There is little literature in Tanzania and the world that explain about gold export and agriculture development except with Rastogi and Mwaitete (2016) in their papers "revealed that there is need for the government to use additional revenue from gold to account for agriculture." The authors are appreciated to acknowledge the role of gold export in developing the agriculture sector but they were based on the qualitative analysis only and they did not applied a mixed method approach that includes regression or granger causality, cointegration.

There is little presented in the literature regarding the gold export and agricultural development even though there are so many others as pointed about who acknowledge that gold is valuable resource with through pointed out on how a nation can gain significantly on gold revenue in order to develop through agriculture. That is why the researcher of this study is examining this study critically and add to more knowledge in literature in Tanzania and Africa as a whole.

2.3 Development of Agriculture and Poverty Alleviation

Ahluwalia (1978) said that "agricultural development has significance impact of reducing rural poverty in India. The author found that the incidence of poverty fluctuate with agricultural output. The author is strongly supported on his view regarding poverty incidence reduce as more and more agricultural productivity is realized in the economy". This view is valid to countries like Tanzania where majority of the people are engaged in agricultural activities.

According to Coxhead and Warr (1995), provides experience from Philippines that "policy intervention by the government matter the most in promoting agriculture for poverty alleviation." In their paper the author used general equilibrium model to examine technical progress in agriculture and changes for poverty. The author never used gold export in their analysis to evidence agriculture development.

According to the World Development Report (2001), describes that different causes of poverty that can be reflected on the poor but failing to acknowledge the role of agriculture development for poverty alleviation and the frameworks only emphasize on the development of social capital as a way to poverty alleviation. In addition, the report do not describes those countries with abundant natural resources like mining, land, water and others in relation to poverty alleviation. Gold resources are not taken into account when considering poverty alleviation in Tanzania.

World Bank (2008) pass ways out of poverty point that "agriculture is the path towards poverty it provides strategies for the path that includes improve Market Access, Enhance small holders competitiveness to facilitate market entry, Improve Livelihood and subsistence agriculture and low skills rural occupation: Increase employment in agriculture and the rural non farm economy." But the World Bank path do not show where the additional resource should come from to improve farming and how? Talking about competitive farming to nation like Tanzania it require additional resources and the World Bank has failed to uncover this additional resource like gold stock that could help account for the

agricultural development in their cycle. That is why the researcher of this study is examining on the role of gold export for agricultural development and poverty alleviation in Tanzania.

It is also pointed out by Weerdt (2009), that "promoting agriculture is the only way to remove people out of poverty with emphasize on increasing trade and business related to agricultural products." This means that the only way for Tanzania to alleviate poverty is to make sure that the agriculture sector grow that will ensure people with income and food security. This context is supported by the researcher that the only way to come out of poverty is through agriculture. But the author never shows additional resources to promote agriculture and where will these resources come from.

Machethe (2004) analyses that "agriculture contributes to poverty alleviation in rural, urban and national level in three ways reducing food prices, employment creation, increasing real wages and improving farm income". The author point further that "designing pro poor policies in agriculture can help reduce poverty in the country". But the author appear he has used qualitative analysis and lack field evidence when pointing out agriculture in rural areas without examining the output in generated. On his view on income generated from agriculture is strongly supported.

According Basu and Maliick (2007), with their experience from India point out that "among the reason for poverty and higher growth in India took place around 1970 and 1980s among the contributing factors to this growth and poverty reduction was revealed to be more equitable distribution of agricultural inputs to small and marginal farmers." In this view influence the same in today situation to countries like Tanzania that if we are to develop we must consider farmers of whom majority of them are poor and so supplying agricultural input equally can be a strategy for poverty alleviation. The researcher applied granger causality and cointegration.

The paper written by (Lrz, Lin, Thirtle and Wiggins 2001), that "agriculture has strong argument in reducing poverty that includes job creation, linkage from

farming to the rest of rural economy and decline in the real cost of food for the whole economy. The researcher's findings were based on the plausible arguments by observing the direct changes on agriculture productivity and poverty." The study was based in UK. The researcher never come up with solution on how agriculture productivity can be improved to countries like Tanzania where the trend in agriculture activities appear to be falling.

Agricultural development is seen as a source of industrial growth and transformation of the economy. This is pointed out by Derek B., Alain de J. and Sadoule E.(2010), who again add that, despite growth changes and challenges in agricultural development, government has a significant role in the economy thereby looking at the multiplier effects of the agriculture sector it plays in the economy. The author also add that new paradigms are needed to acknowledge that agricultural development can trigger economic development in the country, reducing poverty, providing food security and narrowing income disparities.

Similarly Kayunze, Mashindano and Maro (2011) reveals that "agriculture is important in achieving poverty reduction goals in Tanzania that growth in agriculture has multiplier effect on exchange rate and gross domestic product (GDP).The authors discovered that 70% of the people are engaged in agriculture and that is according to their studies with datas ranging the period 1998 to 2009 using quantitative and qualitative data for the regions and district of Mwanza, Rukwa and Newalla". The author in his paper they claim using quantitative approaches but in their analysis there was no model specification to justify the quantitative and generally they appear to be qualitative only. They never pointed out other agricultural commodities like maize since maize is the main food staple. The current researcher will survey maize farmers from northen zone mainly Arusha (Karatu)-Mbulumbulu and Manyara(mbulu district) to examine current level of agricultural production and constraint.

It is also evidenced by the World Bank (2011) that "the poor in Tanzania are overwhelmingly rural (84% of the poor), and overwhelmingly dependent on agriculture as their primary source of income (74%). The study from the World Bank reveals the level of poverty in Tanzania of which is significant level when

it concludes by pointing out that at least 84% of people are poor." This means more innovative approach needs to discover on how the trend on poverty can be alleviated. According to their studies it clearly revealed that developing agriculture in Tanzania it is poverty alleviation strategy and path way out of poverty. The authors reveals the magnitudes of the problem without coming up with solution that can assist in developing the agriculture sector and contribute in alleviating poverty. But the World Bank is being acknowledge through appreciating the role of agriculture in poverty alleviation.

In Tanzania poverty is still a common problem for both city and countryside dwellers but the countryside are the most people impacted with poverty because they mainly rely on agriculture whose performance is has been falling and adding to more poverty. It is also evidenced from different authors after independence following a socialist era and the free market oriented economy Tanzania is still finding the right path out of poverty.

This role of appreciating agriculture as a strategy for poverty alleviation is also emphasized by (Chrstaensen, Demry and Jesper, 2006) they wrote in their paper that agriculture is the entry point to poverty alleviation and it is the way to economic development and they pointed out that the poor participate more in agriculture and that is the only way for poverty alleviation. And in order to realize poverty reduction they argued that the only way is to "pursue more agriculture investment strategies for the rural economy". Their analysis were supported by using the direct effect and the indirect effect and regression was used to validate their finding. The study was too general covering Asia, Sub Saharan Africa based on secondary data only also these authors they never explain the strategy to consider the role of gold export in agricultural development and they ended up complaining and pointing out issues around agriculture and poverty. Survey analysis, granger causality were not taken into account when looking agriculture sector in the context of Tanzania.

Gollin (2009) point out that you cannot talk of poverty in Africa without examining the role played by agriculture since majority of the poor lives in rural area and agriculture is their livelihood. The author add that the roadmap to

poverty alleviation is through agriculture development. The author is appreciated when pointing the role of agriculture in poverty alleviation but in his paper he was too qualitative and never investigate strategically on how gold could account to agricultural development and poverty alleviation.

Efforts needs to be done to direct all other resources especially gold export to develop the agriculture sector that can move people out of food poverty and malnutrition through strategies that are revolutionary for the poor country like Tanzania given its abundance of gold resources. The more we develop the agriculture sector more food security in the country with lower level of inflation and poverty alleviation.

According to World Bank (2011) argues that many poor Tanzanians are still subsistence farmers. They rely almost entirely on their own production of food grains. They have little cash income, so the depth of their poverty depends very much on how much they are able to grow in a given year on their own land, and how long it lasts them into the next year. It is estimated that some 2 million Tanzanians are food insecure in any given year, and another 6 million are at typically at risk of falling into food insecurity if their harvest is inadequate, or there is widespread drought. This suggest for strategic use of Gold export to account for the growth of the agriculture sector hence alleviating poverty.

According to the study done by Paul K and Thurlow J (2011), highlighted that "rapid economic growth has failed to improve poverty in Tanzania". The researchers are acknowledged in his analysis when pointing out the agricultural growth and poverty. The authors focus on nutrition status and used maize a one of the component in their argument when generalizing cereal products and calories. Authors also acknowledge that maize is the main food crop and Tanzania has favorable condition for the growth of the product but the researcher was also puzzled to observe that output per tons of maize was also falling. The author never come up with reasons on why maize production was falling. Researcher applied closed economy dynamic computable general equilibrium model when analyzing his variables on agriculture and poverty and nutrition's in Tanzania.

Also Schneider and Gugerty (2011) in their studies on agriculture productivity and poverty reduction: linkages and pathways they evidenced that there is a multiple pathways when agricultural productivity is increased firstly we can realize through increase in income, secondly employment generation and food inflation. This is also similar view with Peter (2005) who also emphasize on the role of increasing agriculture productivity to increase food supply. The authors point that all these will depend on how citizen can embrace technology to increase productivity. Both two paper never address on how productivity should be increased to poor nation like Tanzania and appeared to be too qualitative in their analysis. This element is found to be missing even when they say citizens embracing technology, most of the farmers are poor how can they get technology to improve agriculture? Again is observed from the authors that they failed to uncover the role of gold revenue for agricultural development and poverty alleviation. It is also observed in their paper that they are too qualitative in their analysis and failed to come up with the model suggesting for agricultural productivity.

In the book of Ngugi, Karau, and Nguyo (2012) explained that agriculture, supply the needs of total population for food and raw material, agriculture also provide a markets for industrial products, It provides exchange rates to the country, it is provides surplus fund for investment and employment opportunities. Agriculture contributes to the gross domestic products for merchandises and services made by residents during the period of time normally a year. The authors only pointed out the what agriculture can provides but never consider how to increase agricultural productivity for poverty alleviation. Agin the author had no model that was applied when writing the book. Generally they appear to be narrow in their analysis.

On their studies Omorogiuwa, Zivkovic and Ademoh (2014) evidence that agriculture is important in promoting the economy of the country. The study demonstrate that for any country to develop must first promote agricultural activities. When the agricultural productivity is stable then other sector can grow progress. The author's uses trend analysis in terms of current perspective and

descriptive methods for Nigeria and found that agriculture productivity is important for the nation to progress. The authors never pointed out about gold export. In their analysis they tried to compare agriculture productivity with oil. The current researcher of this study will focus the study in Tanzania

Futhermore Omorogiuwa, Zivkovic and Ademoh added that the way to economic development is through improving productivity in agriculture otherwise the country may find itself developing and while agriculture productivity is ignored hunger malnutrition will be observed and country may resort into importation of food. The authors uses Nigeria experience when they were in boom period during 1980's the agriculture sector was neglected they ended up importing food from other countries of which was expensive to domestic economy. They suggested that economic development will be realized when there is increase in agriculture productivity. But they never state how in their paper.

According to Nyanjom and Konyango (2013),reveals that agriculture may contribute very much on to the national development because it emphasize on the soil and its products which humanity depend for lively hood. It is the most valuable resource of the world. As economics agriculture remain the dominant segment of the economy in providing job to the greater population. Agriculture facilitates rural access of road and other infrastructure which encourage the flow of goods and services. Provision of extension services like credit facilities, medical, electricity is an indication of national development.

Toyin (2016) examines the relationship between agricultural growth and economic growth in South Africa the researcher found that there is no causality components between agricultural growth and economic growth in South Africa. The researcher invalidate export led growth hypothesis through agriculture South Africa. The researcher applied granger causality and cointegration. The study applied time series data covering the period 1975-2012 for South African economy. The study do provide justification that South Africa should stop farming of which can be detriment to the nation. Weakness of applying a single model for estimation and jumping into results is another problem facing the

author. The current researcher is applying mix method approaches in Tanzania where regression, granger causality and survey method shall be used to provide useful information to policy maker.

Mwaitete (2014) in his paper concluded that there is a weakness in Tanzania for utilizing it own natural resources for development of the country with more revenues generated from gold, diamond, gas etc. that can help account for poverty alleviation. It is appreciated by the author in expressing views regarding the abundance of natural resources and country failing to alleviate poverty. This view is strongly supported and the researcher extent his work through exploring more on mixed method approaches where qualitative and quantitative shall be more explored to make the study useful on the role of gold export for agricultural development and poverty alleviation. It is in the mind of the researcher that no way out of poverty if agriculture is not supported.

2.4 Agricultural Production

Limbu (1999), explain "that the use of modern technology is not common practice in Tanzania and the agriculture is dominated by small holders farmers who produce 75% of the total population and 60% in rural population live in absolute poverty with lower agriculture productivity. The author argued that the modern technology can help farmer to improve productivity and help reduce poverty". But the author failed to acknowledge that those poor farmers in Tanzania have less income to enable buy modern technology. The author never examined where the addition revenue to buy technology should come from? This is a matter of concern of which the current researcher is assessing.

Furthermore Limbu, is appreciated by pointing out that "maize agriculture farming is the major food staple in Tanzania is grown in Tanzania by 45% of arable land and 75% of the total harvest is spent for food consumption". The author highlight problems facing maize farming without empirical evidence and failing to acknowledge that maize farming is profitable or not to make justification for technological requirement among farmers.

According to Eriksen , Brown, Kelly(2005), had studies in Kenya and Tanzania regarding the dynamic of vulnerability and locating coping strategies for small holders farmers in Kenya and Tanzania and they focus on how farmers cope with drought without pointing out sustainable solution to farming. Cost and benefit analysis was far from using it.And this is normal to many academics and researcher the point out the problem but bring sustainable solution is the key constraint for the researchers themselves. Tools and technique used by the researcher was qualitative approach where questionnaires and interviews were applied in the study with attention of measuring the magnitudes of the problem surrounding drought.

According to Doss, Mwangi, Verkuil and De groote (2003), they reveals that "with adoption of improved technologies for staple crop production is an important means to increase productivity of small holders agriculture in Africa and bring about economic development for millions of poor in Africa. They pointed that there are some difficulties in Africa when formulating policies on agriculture productivity". The weakness is realized by authors where they never pointed out where the additional resource come from to finance the technologies for agricultural productivity in Africa. Poor farmers require additional resource and revenue so that they can use quality seed and modern technologies. That is why the current researcher will assess the current maize farm cost and benefit and examines the returns with comparison to gold revenue.

Snapp, Blackie and Donovan (2003), argues on the failures that research has failed to take into account farmers constraints and risk and how farmers can adopt to technologies. The authors pointed out that farmers require affordable input but again failing to reveal where will the addition revenue will come from so that agriculture input becomes affordable. The author based his studies on the literature review analysis that bring doughty and questionable when coming up to findings and conclusion. But they are appreciated on pointing out regarding lower price farm input that can assist in Production of more agricultural products. Never pointed out on how gold revenue can assist in increasing technologies and other farm inputs.

According to (Senkondo et al , 2004), in their studies on profitability of rain water harvesting for agricultural production in selected semi-arid areas found that rain water harvest has potential in poverty alleviation through increasing agricultural production, Where the need arise by farmers to use canal and tanks for water storage especially maize, paddy and onion farmers to increase their yield. The author applied internal rate of return and net present value to assess the level of profitability in Same makanya areas based on the rain water harvest production. The researcher applied qualitative techniques to make justification on the findings. He failed to uncover the additional resources required to set up tanks and other storage for farmers since majority of farmers are poor. The status of poor farmers is also shown in his findings. Therefore the need arises to examine potential resources like gold resources that can account to farm growth.

Studies conducted by (Heisey and Mwangi, 1996) , who examined on the fertile use for maize production argues that the more fertilizer farmers uses the more the output but this author never uncover where the addition revenue for the farmers will come from so that farmers can be able to use fertilizer on his farming, Their study were too simple and based on the qualitative analysis only. The authors are appreciated in their studies for taking into account the fertilizer to increase maize production.

Studies done by De and Sadoulet (2009) reveals that “rural poverty reduction has been associated with growth in yield and agricultural labor productivity. The author evidence that GDP growth originating from agriculture induce income growth among the poor”. The author acknowledge that agriculture is very powerful in the economy because of its multiplier effects to other sector of the economy. Therefore this view is highly appreciated but the analysis is criticized because the author do not come up with suggested solution towards boosting agriculture among the poor farmers to enable more yield across areas and where those resources should come from this is the gap that the author is facing.

Rastogi and Mwaitete (2017), the government must increase innovation and technology to farmers to increase yield of maize production given their farm size. Also authors point out that farmers must be supplied with quality seed to ensure

high level of output and this has potential in alleviating poverty in Tanzania. The author found that maize is the main food staple in Tanzania and once maize is improved more available income among farmers and improved livelihood among the poor. The authors appeared to be qualitative in their analysis the current researcher is extending the work to explore more in the role of gold export in agricultural development and poverty alleviation.

2.5 Financing and Agricultural Policies

Aneto, Ogbechie, Kelikume and Ikpesu (2016), in their studies on credit supply and agricultural production in Nigeria applied VAR approach to discover the significance of commercial loan on agriculture has significance to agricultural production. The researcher applied time series data for the Nigeria and validated his study based on the VAR. Authors never uncover poverty and lower income facing farmers in other countries and that commercial loan can be detrimental to farmers.

Tanzania has implemented several reforms and strategies to promote the agriculture sector in the country but the result has not been impressive and agriculture sector is not performing to the required standard despite a reserve of gold stock and other natural resources. Agriculture growth rate has been falling along with the policy reforms taking place in Tanzania that appear to be unrealistic when it comes to the results in the agriculture sector and this calls that something has to be done to assess critical on how the agriculture sector can be developed given the gold stock, production and export in the country. Among the agriculture policy reforms and strategies that took place in Tanzania are:

- The iringa Declaration of siasa ni Kilimo(Politics is Agriculture) of 1974
- Kilimo cha Kufa na Kupona (Life and death effort to improve agriculture)
- Azimio la Arusha (Arusha Declaration)1967
- Vijiji vya Ujamaa (Villagelization)
- Chakula ni Uhai (Food is Life)
- Ukulima wa Kisasa (Modern Agriculture)

2.5.1 Kilimo Kwanza (Agriculture First) Policy in Tanzania (2009-2015)

This is the current agriculture strategy in the country that was developed to revolutionize agriculture in Tanzania and launched in 2009 to accelerate development of the country through promoting agriculture in line with the Tanzania Vision 2015.

The policy strategy includes all encompassing arrangement of strategy instruments and vital intercessions towards tending to the different sectoral difficulties and exploiting the various chances to modernize and market farming in Tanzania and exploit agriculture opportunities of 44 million hectares of which only 23% of arable land is utilized.

According to Bangi and Mgeni(2014), said that Kilimo Kwanza (agriculture policy first) policies was over narrow in scope despite its significance that makes to be unrealistic by nature. The author also pointed out that since independence agriculture has never been beneficial to people in Tanzania. The author revels remarkably that agriculture has brought very minimal difference between colonial and post-colonial agriculture. The researcher used qualitative approaches data based on Kilimo Kwanza policy. In their analysis they fails to appreciate gold stock in the country that can help account for agriculture and poverty alleviation. They never apply survey approaches to examine whether farming is brings returns or not. They never apply any model to justify their analysis.
The policy is guided by the following pillars as indicated by the Ministry of Agriculture and Food Security and cooperative(2012):

- To impart political will and duty of all Tanzanians to kilimo kwanza resolutions for horticulture change by SME
- To Mobilize financial resources from different stakeholders to fund the sector and initiate Tanzania Agriculture Development Bank that shall provide credit to farmers
- To Emphasize for good governance checking & assessment and involvement of the private sector as a paramount of the strategy
- Food crop is given high priority by producing what we consume.

- To facilitate access to land for agriculture and its exploitation
- To introduce and review incentive polices for agriculture
- To set up commercial ventures with in reverse and forward linkages in the farming area.
- To promote the use of Technology by producers
- To develop infrastructure for irrigation rural electrification, storage, road railways airport, market center information technology
- To mobilize Tanzanians to support and implement Kilimo Kwanza.

But when examining all the government policies never uncover the gold stock and resources in Tanzania that could account for agricultural growth and poverty alleviation that is why you may be surprised to with all those good policy reforms the agriculture sector performance falls along those government policies, This also is similar view with Bangi and Mgeni(2014). This means there is something that require to be investigated in Tanzania the gold revenue. Literature shown that many researches and authors complain about agriculture in Tanzania and Africa as a whole this gives doughty the current researcher on type of research under investigation and that is why the current researcher is examining on the role of gold export in agricultural development and poverty alleviation. It should be noted that most of the farmers lives in rural areas and many of the are poor so extra effort and revenue is needed to improve farmers productivity and income

Onyenucheya and Ukoha(2007) point out that "inability of the borrowers to repay the loan is the major concern to banks. This involve the non-repayment of both the interest and the principles by farmer borrowers. This can lead to farmer's borrower liquidation". This was noted in their paper regarding farmers borrowing from financial institutions mainly the banks. The author did not consider that many farmers are poor and they do not have a stream of monthly income. They only have land as collateral against their loan. The author used regression analysis in his study that was based in Nigeria. The author never pointed out where the other sources of income should come from to improve their yield that could make them qualify for loan. That is why in the current research gold revenue shall be explored more to examine how it can improve agriculture. The

current researcher is going to explore the benefit and cost facing maize farmers where NPV shall be applied to assess the farm investment under investigation.

It is called attention to by Feed the Future (2011) that, “restricted monetary assets, powerless foundation, and poor arrangements have not gave impetuses to build up the farming area. Just nine percent of the Tanzanian populace has admittance to formal monetary administrations, and just four percent has gotten an individual advance from a bank.” This view is acknowledged by the current researcher that farmers capacity to finance agriculture inputs and financial support from the government is important. Agriculture financing is crucial in the effective utilization of land for agricultural production with modern technology application in the country.

2.6 Gaps in the Literature

From the above literature review studies hardly talk about gold export in agricultural development for poverty alleviation. This area needs to be explored and add more knowledge on literature to Tanzania and the world. Authors from Africa and Tanzania in general only complain about agriculture without suggesting on where additional resource should come from to boost agriculture investment to countries where agriculture is very basic and people are poor. So this weakness arising from the current literature it prompt the research to investigate the study.

Other authors found pointing like quality seeds and technology as problem facing agricultural productivity without actually examine the real situation on where the farmers from Tanzania and Africa as whole get technology that could enable farmer produce more. Therefore this study is going to examine on the role of gold revenue for agricultural development and poverty alleviation.

It is noted from empirical studies that the stock of wealth like gold in Tanzania and Africa has not been mapped effectively for agricultural development and poverty alleviation. Therefore the question comes here on how to improve

agriculture with existing stock of resources? This is a matter of concern in Tanzania where it is believed to have larger stock of gold.

The researcher contribution in this work will be to find out solution for the agriculture development and the paper related to maize involvement will lead to the improvement of quality of maize farmers,

According to Eriksen , Brown, Kelly(2005),The authors had studies in Kenya and Tanzania regarding the dynamic of vulnerability and locating coping strategies for small holders farmers in Kenya and Tanzania and they focus on how farmers cope with drought without pointing out sustainable solution to farming. Cost and benefit analysis was far from using it. And this is normal to many academics and researcher the point out the problem but bring sustainable solution is the key constraint for the researchers themselves. Tools and technique used by the researcher was qualitative approach where questionnaires and interviews were applied in the study with attention of measuring the magnitudes of the problem surrounding drought.

Sindhu (2013), focused his study in India and never include gold export. Despite of being in India the author also focused on gold price, repo rate inflation and Us dollar and crude oil with the theme around factors for gold in India, As mentioned somewhere above he used regression analysis and correlation to justify his study. Secondary data only has been used to justify his study in India.

According Msuya, Hisano and Nariu(2008) they applied frontier production model to estimates the level of technical efficient for 233 stallholder's maize farmers in Tanzania with aim to find way to increase maize productivity in Tanzania and they found that maize productivity is low with lower level of education among farmers and limited capital. The authors never used cost and benefit analysis to uncover the returns on maize farming and how gold revenue can account to more maize returns this was lacking in their analysis. How maize farmers can get capital and other input it was not justified. Failure to unlock gold revenue to account for productivity in Tanzania is shortfall among researchers.

Limbu (1999), is acknowledged on examining the role of technology in agriculture productivity but his analysis is found to be weak when serving the Tanzania farmers who majority of them are poor and can't afford the modern farming technology that call for more studies in the country. The author also never examine about gold revenue to country like Tanzania where there is gold stock to account for agricultural productivity.

Amare, Asfaw, Shiferaw (2012) analyzed the seed constraints among maize farmers when In their analysis and impact for welfare improvement using a probit regression model based on cross sectional sample survey of 613 small scale farmers and found that there is inadequate supply of seed in Tanzania, and human capita were the key issues identified by the authors. Authors were observed to demonstrate the magnitude of the problem but never revel the additional resource required to improve maize farming in Tanzania like gold revenue. Authors again never apply the benefit cost analysis among farmers to measure the level of profitability.

Shaffiee and Topal (2010) in their studies applied econometric estimation with time series data and considered data stationary for the variable under estimation especially when predicting gold price.In his studies the author confined themselves on global market trend and never pointed out the role of gold export in agricultural development in Tanzania.

Prakash and Sundararajan (2014) on their studies on empirical analysis on the relationship between gold and silver used correlation analysis covering the period of 13 years from 2000 to 2013.The aouthors confine their studies in India alone.

Subhashine and Poornima(2014) applied regression techniques, cointergration and causality when finding out factors determing gold price.The study conducted by Musingwini and Nangoro (2011) focused on three variables namely gold silver and copper through retrieving data from secondary sources only and correlation was used to validate the study.

Mehrara and Firouzjaee (2011) in their studies on the utilization of granger causality they analyzed the connection between fare development and GDP development in creating nations in light of the board information co intergration examination for 73 nations amid the period 1970-2007. Granger causality test was likewise connected to explore this relationship. Their discoveries show there are for quite some time run relationship in the middle of fare and GDP. They additionally found that there is no short run relationship in the middle of fare and GDP development. These specialists got information from oil delivering nations and non oil creating nations.

Necmiye (2012), also applied granger causality technique in examining the relationship between agricultural growth and economic growth in the long-term and analyzed whether there is relationship between agricultural credits as an agricultural support and agricultural growth in long term. He also investigated if the agricultural credits is effective on the number of people employed in the agriculture sector. Studies revealed that agricultural credit has direct effect on agricultural income and employment .The results were based on the regression analysis and granger causality. Based on his findings he acknowledge that agriculture is the base for economic growth.

Also the work done by Shombe N . H on his study focused on causality relationship between total export and agriculture and manufacturing in Tanzania and found that agricultural causes both agricultural GDP and manufacturing GDP .The researcher also evidenced that manufacturing does not granger cause export and agriculture. This researcher applied time series data for the analysis covering the period 1970 and 2005 tested for granger causality.

Simwela and Rutaihwa (2012) analyzed econometric analysis of FDI in the mining division to Tanzania export capabilities for the period 1989 to 2009.The researchers applied the ordinary least square method as analytical technique and found that total export performance to the rest of the world is negative and insignificant and therefore concludes that contribution of FDI in mining have been weak exerting negative pressure on Tanzania export performance.

Ayinde (2011) analyzed the effect of agriculture growth on unemployment and poverty in Nigeria by using granger causality approach where the researcher focused on three main variables that is poverty rate, unemployment rate and agricultural growth at time t. Granger causality test and co-integration test were used in the study.

According to Tiffin and Lrz (2006), the authors applied granger causality test in their studies with the panel data and found that "agriculture value added is the causal variable in developing countries" even though Tanzania was not part of his sample. But the author's views on agriculture is found to be valid statement that agriculture the causal variable in developing countries.

Mousavi and Leelavath (2013) on their studies on "agricultural export and exchange rate in India: The granger Causality Approach" used time series data and tested for granger causality and co-integration(ADF and Johansen test) were used in the study. The study revealed that there was no significance relationship between quantity of agricultural export and real exchange rate.

Ahluwalia, (1978) applied correlation when examining "poverty incidence and agricultural output". The focus of his study was India, the author also never take into account gold revenue for countries like Tanzania where it is believed to have larger stock. This call for the current researcher to examine the gold revenue for agricultural development and poverty alleviation.

Therefore it has been noted that many researchers have not mapped out gold stock clearly particular the Gold export and its linkage to agricultural development for poverty alleviation is not investigated in line with the mixed method approaches of both the qualitative and quantitative framework as shown in the methodology.

According to Creswell (2007) reveals 'mixed method approach to research provides more complete understanding of the research problem than ether quantitative or qualitative alone'. The author add that "mixed method helps to explain results in causal models". Furthermore the author highlight that "mixed

method helps to examine if the intervention will work in the future". (Wisdom and Creswell 2013) add that use of mixed method research validate findings using qualitative and quantitative data sources. That the study helps the use of qualitative data to explore quantitative findings and help involve different stakeholders into the research study easily."

Furthermore in research study done by (Dilanth, David, Marjan, Rita 2002) explain that "single methodology often fails to explore all the research components therefore the use of mixed research methods is suggested to counteract the weakness and enhance research study with better solution". The authors never explain about gold export and agricultural development.

Therefore, given the potential role of gold export to the world, the need arises for gold export to account for agricultural growth as an important factor and the variable gold export must be investigated with better understanding of the problem under investigation. The results obtained from gold export will be used as inference point for other natural resources to account for inclusive growth and poverty alleviation in Tanzania especially with increased opportunity in agricultural development.

2.7 Summary

The table below demonstrates a summary of different authors with their study focus area and technique used during their studies as shown here under;

Table 2.1 Selected Summary of Comparison and Technique Used Among Researchers

S/NO	AUTHOR NAME	TITLE	TECHNIQUE USED
1	Shaffiee and Topal (2010)	"Overview of Global gold Market and Gold price Forecasting"	applied econometric estimation with time series data and considered data stationary for the variable under estimation especially

			when predicting gold price
2	Prakash and Sundararajan (2014)	"An Empirical Analysis on the relationship between Gold and Silver with Special Reference to the National Level Commodity Exchanges, India"	used correlation analysis covering the period of 13 years from 2000 to 2013
3	Subhashine and Poornima(2014)	"Empirical Investigation of the causal relationship between gold price, exchange rate and crude oil"	Applied regression techniques, cointegration and causality when finding out factors determine gold price.
4	Musingwini and Nangoro (2011)	"Empirical correlation of mineral commodity prices with exchange traded mining stock prices"	only and correlation was used to validate the study
5	Mehrara M and Firouzjaee A (2011)	"Export growth and GDP growth in developing countries"	granger causality test was applied used Panel data
6	Kumar N and Smith R.(2004)	"Real income, ,export and human capital stock"	granger causality test was applied Tested for unit root in testing the direction of causality and applied augmented Dick Fuller (ADF) and Philips

			Perron(PP) unit root test Time series data were applied
7	Necmiye S (2012)	"Relationship between agricultural credit and economic growth"	Regression analysis and granger causality
8	Nasiru I(2012)	"Government expenditure and economic growth in Nigeria over the period 1961 to 2010"	The study applied bound test approach to co-integration based on the unrestricted error correction model and pair wise granger causality test.
9	Shombe H	"Total export and agriculture and manufacturing in Tanzania"	This researcher applied time series data for the analysis covering the period 1970 and 2005 tested for granger causality.
10	Simwela A and Rutaihwa J(2012)	"Econometric analysis of FDI in the mining sector to Tanzania export capacity for the period 1989 to 2009."	The researchers applied the ordinary least square method as analytical technique
11	Ayinde O.E (2011)	"Effect of agriculture growth on unemployment and poverty in Nigeria"	Poverty rate, unemployment rate and agricultural growth at time t. Granger causality test and co-integration test were used in the study.
12	Mousavi S and Leelavath	"Agricultural export and exchange rate in	Granger causality test and cointergration test(Johansen

	S(2013)	India: The granger Causality Approach"	test and ADF) were applied in the study Time series data were used
13	Laila V and Maghaddasi R(2009)	"Relationship between total exports with agricultural and manufacturing GDP in Iran"	Granger test and cointegration test (ADF) were used Time series data were used for the study
14	Harper A,Valparaiso J and Wadhwa M,	"Price Volatility in the Silver Spot Market: An Empirical Study Using Garch Application"	An Empirical Study Using Garch Application model in USA

CHAPTER THREE

RESEARCH METHODOLOGY AND TOOLS

3. 1 Nature of the Study

The study is causal and it explores the role of gold export for agricultural development and poverty alleviation in Tanzania. It investigates deeply on gold production, value and how gold can be ploughed back to improve the key sector of the economy especially the agriculture sector where majority of people in Tanzania are engaged into this sector.

The main methodology used for this study was both qualitative and quantitative descriptive research. The main reason of using these two approach was to get more investigative analysis and details based on the role of Gold export in agricultural development and poverty alleviation in Tanzania. Poverty in Tanzania is complex by nature to a country where there is larger deposit of gold and the third gold producer in Africa as reveled in the literature. Therefore the qualitative approach and quantitative approach has been used to investigate the study and make more informative. Mixed approach has been adopted in this study for better understand of the problem and come up with better solution that can change the life of the poor. Feelings on how people value gold in the country cannot be quantified, it require a qualitative investigation based on the primary source. Gold awareness cannot be known from quantitative perspective therefore need for qualitative approach. Again when examining current farmer's constraints require qualitative approach to validate current situation.

In this study questionnaires, interview and discussions were applied in order to get data on primary sources for the period of September 2015 to March 2016. Self-administered questionnaires were designed to seek views, opinions, and relevant data from the respondents in respect to the objectives of the study. The questionnaires were simple with the kind of questions in which, respondents had wide freedom of choice to express view. Formal and informal Interviews were also carried out in order to get a general picture and views about issues under

investigation. Interviews were conducted as a way of supplementing the data which were generated through questionnaires. Observation method was used by the researcher to physically observe the field situation on issue under survey. In some cases group discussions was applied by the researcher to discuss issues under this survey followed by a final meeting that was held at Bargish Ants-Mbulu district in Manyara region. This assisted the researcher to gain understanding and first hand data on issues related to the role of gold export in agricultural development and poverty alleviation in Tanzania.

Again secondary data with time series data covering the period of 24 years from 1990 to 2014 were used to a larger extent to validate the study and support analysis under scientific approach to observe variable of interest under investigation for policy recommendations. Granger causality test and test for cointegration was conducted. Long run and short run causality was examined among variables under estimation through vector error correction model.

In testing for granger causality, the first step in this study is that, data were tested for stationarity and for this case variables were differentiated to examine the stationarity properties. The Augmented Dickey Fulley (ADF) was applied to perform a unit root test. The researcher applied hypotheses to guide the study when testing for unit root to examine the validity of the variables in the proposed model.

In assessing the current agricultural production Cost and benefits analysis was applied. Special attention for maize production its cost and benefits was the focus. Maize is considered to be the main food staple in Tanzania and therefore focusing on maize cost and benefits among farmers was a good strategy to examine the state of their production and the challenges found was used to examine the role of gold can play in improving the agriculture sector given the maize farm production.

The researcher investigated the key variables that is gold export, gold price, economic growth and agricultural growth or value added in agriculture. It is in the belief of the researcher of this study that when agriculture is improved then

poverty shall be alleviated hence sustainable economic growth in Tanzania. The researcher believe that the path for poverty alleviation for the nation like Tanzania and Africa today should be agriculture growth focus. Because gold is money by itself therefore the need arises to plough back part of gold export revenue to develop the agriculture sector.

3.2 Modelling Framework and Causality Relationship

Causality relationship between gold export and agriculture productivity shall be assessed critically by the researcher and also gold export and poverty alleviation will be investigated as shown in the next section.

Unlike regression analysis that examines the relationship among variables, in this study the author apply granger concept and examine the causality that in this context it is assumes that if X causes Y then change of X happen first then proceed by changes in Y and also it is added that If X causes Y there are two condition to be satisfied as revealed by Gujarati (2003) and METU (2014) They explain that

a) X can help in predicting Y and regression of X on Y has big R^2
b) Y cannot help in predicting X

It is also discovered by Gujarati(2003) that "by using regression alone is difficult to investigate causality for example the significance of the coefficient β in the regression"

$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$

The authors pointed further that this "equation only tells the occurrence of X and Y and not that X causes Y. In other words regression shows that there is relationship between X and Y and does not tell the nature of the relationship of whether X causes Y or Y causes X and this is the granger causality".

Granger test was first proposed by Granger C.(1969) referred to as granger causality who developed the concept on examining the causality among two variable. The Author provided light regarding granger causality in drawing up analysis regarding the causality between two variables. Since then there has been number of researcher who applied the causality concept on their analysis this

includes Gujarati(2003) and METU(2014) applied the theory and demonstrated the test outcome of the granger causality technique as follows

- "X granger causes Y but Y does not granger cause X"
- "Y granger cause X but X does not granger cause"
- "X granger cause Y and Y granger cause X i.e there is feedback system"
- "X does not granger cause Y and Y does not granger cause X"

Gujarati (2003) and METU (2014) showed the main steps for testing granger causality as shown here below;

The researcher start by explaining that the simplest test is to estimate the regression which is based on

$X_t = C_1 + \sum \sigma X_{t-1} + \sum \beta_j Y_{t-1} + \varepsilon_i$

The author add that use Ordinary Least Square method then conduct F- test of the null hypothesis

$H_0 : \beta_1 = \beta_2 = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \beta_p = 0$

The researcher runs the following regression and calculates RSS(full model)

$X_t = C_1 + \sum \sigma X_{t-1} + \sum \beta_j Y_{t-1} + \varepsilon_i$

Further, following limited regression is run and RSS(restricted Model) is calculated

$X_t = C_1 + \sum \sigma X_{t-1} + \varepsilon_i$

Then F test is used to obtain RSS from stages 2 and 3

F= ((n-K)/q).(RSS restricted – RSS full)/RSS full))

If H_0 rejected then X causes Y

The author finally commented that this technique can be used in investigating whether or not Y causes X

In this case the researcher of this study applied granger causality test among variables to enable the researcher to develop policy recommendation about the causality impact for the named variables in relation to the role of gold export in agricultural development and poverty alleviation.

Gujarati (2003) added that when the estimated model includes one or more lagged values of the dependent variable among its explanatory variable it is called Autoregressive Model and therefore it can be pointed as

"$Y_t = \beta_0 + \sum \beta_1 X_{t-1} + \sum \beta_2 Y_{t-1} + \varepsilon_i$……..Auto regressive model."

The autoregressive model as pointed out by Gujarati again is that they are used in econometrics estimation and influenced by a time lag. Stock and Watson (2001), added that "VAR is used for interpreting the relationship between the variables. Also Zivot and Wang (2003) pointed out that VAR model can be used for policy analysis."

Zivot and Wang (2003), "Vector auto regressive Model(VAR) is the one of the useful method of analysis and flexible for the analysis of the time series data and provides superior forecast."

3.3 Granger Causality Test

In order to perform the granger causality test the researcher has considered the following key variables of interest for causality ie

- Gold export and Agriculture productivity and growth
- Gold export and Poverty Alleviation

The variables were used to determine granger causality, cointegration and causality with short and long run relationship analysis and drawing up policy matters and examine its implication. Granger causality test assumes that the information generated from the time series are relevant for the prediction. This is also argued the same by Gujarati N (2003) who supported the view that when considering for granger causality test then data have to be in time series. The researcher used time series data from 1990 to 2014.

The main assumption underlying the granger causality in this model is that variables i.e their variance and mean are time invariant this means they do not change over time. If they are not stationary we should make them stationary. The researcher tested for stationary at 5% critical value and determine the level of stationary by using a STATA (2009) version 11.

Following the validity of the variable the researcher tested for granger causality as shown here below;

3.3.1 Gold Export and Agricultural Productivity a granger causality and cointegration

Model Specification

a) $DGETRATE_t = \beta_1 DGETRATE_{t-i} + \beta_2 DAGRICP_{t-j} + \varepsilon$

b) $DAGRICP_t = \beta_3 DAGRICP_{t-i} + \beta_4 DGETRATE_{t-i} + \mu$

Hypotheses guiding Granger Causality

- H_0 : $DAGRICP_t$ does not granger cause $DGETRATE_t$
- H_1 : $DAGRICP_t$ granger cause $DGETRATE_t$
- H_o : $DGETRATE_t$ does not granger cause $DAGRICP_t$
- H_1 : $DGETRATE_t$ granger cause $DAGRICP_t$

Where;

DAGRICP = Agricultural Productivity growth rate at time t

$DGETRATE_t$ = Gold Export growth rate at time t

μ, ε = are Error term or residual value

$\beta_1, \beta_2, \beta_3, \beta_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

Assumption of the Model

DAGRICP and $DGETRATE_t$ are stationary if they are not stationary we have to make them stationary to test for granger causality. It is also assumed that ε and μ are uncorrelated.

In examining whether gold production growth rate for export causes poverty alleviation in Tanzania or poverty alleviation causes gold production growth rate for export the researcher is guided with the hypotheses and decision was based on

the 5% significant level. The following is the model specification that was used for granger causality;

3.3.2 Gold Production for Export and Poverty Alleviation a Granger Causality and Cointegration

Model Specification

a) $DPVRATE_t = \lambda_i DGOLDPDGR_{t-i} + \lambda_2 DPVRATE_{t-j} + \varepsilon$

b) $DGOLDPDGR_t = \lambda_i DGOLDPDGR_{t-i} + \lambda_2 DPVRATE_{t-j} + \mu$

Where:

DPVRATE = Poverty alleviation rate

DGOLDPDGR = Gold Production for Export

ε and μ = Error term or residual value

$\Lambda_1\ \lambda_2\ \lambda_3\ \lambda_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

Case One Hypothesis:

H_0 : Poverty alleviation rate(DPVRATE) does not granger cause Gold Production for Export (DGOLDPDGR)

H_1 : Poverty alleviation rate(DPVRATE) granger causes Gold Production for Export (DGOLDPDGR)

Case Two Hypothesis

H_0: Gold production for export (DGOLDPDGR) does not granger causes poverty alleviation rate (DPVRATE)

H_1 : Gold production for export (DGOLDPDGR) granger causes poverty alleviation rate (DPVRATE)

Decision Criteria for granger test Causality

The researcher applied VAR model to develop test for granger causality by using a statistical package STATA and make decision based on the 5% level of significant in whether to accept or reject the variable and draw policy conclusion regarding granger

3.3.3 Gold Production Growth Rate and Gross Domestic Product a Granger Causality and Cointegration

Whether economic growth causes Gold production or Gold production causes economic growth in Tanzania

Model Specification

a) $DGDPR_t = \beta_1 DGDPR_{t-i} + \beta_2 DGOLDPDGR_{t-j} + \varepsilon$

b $DGOLDPDGR_t = \beta_3 DGOLDPDGR_{t-i} + \beta_4 DGDPR_{t-i} + \mu$

- H_0 : $DGOLDPDGR_t$ does not granger cause $DGDPR_t$
- H_1 : $DGOLDPDGR_t$ granger cause $DGDPR_t$
- H_o : $DGDPR_t$ does not granger cause $DGOLDPDGR_t$
- H_1 : $DGDPR_t$ granger cause $DGOLDPDGR_t$

Where;

$DGDPR_t$ = Gross Domestic Product Annual Growth Rate at time t

$DGOLDPDGR_t$ = Gold Production Growth Rate at time t

μ, ε = are Error term or residual value

$\beta_1, \beta_2, \beta_3, \beta_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

Assumption of the Model

DGDPR and DGOLDPDGR $_t$ are stationary if they are not stationary we have to make them stationary to test for granger causality. It is also assumed that ε and μ are uncorrelated.

3.3.5 Agriculture Growth and Economic Growth a Granger Causality and Cointegration

This is another area that the researcher investigated to examine whether economic growth causes agriculture growth or the agriculture growth causes economic growth in Tanzania. The following was the model applied for the causality;

a). $G_{r\,t} = \lambda_i \text{ Agric}_{t-i} + \lambda_2 G_{r\,t-j} + \varepsilon$

b) $\text{Agric}_t = \lambda_i \text{ Agric}_{t-i} + \lambda_2 G_{r\,t-j} + \mu$

- H_0 : Lagged Agric does not granger cause G_r
- $H_{1:}$ Lagged Agric granger cause G_r
- H_0 : G_r does not granger cause Agric
- H_1 : G_r granger cause Agric

Where:

Agric = Agriculture growth

G_r = Economic growth

ε and μ = Error term or residual value

$\Lambda_1\ \lambda_2\ \lambda_3\ \lambda_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

3.4 Explanation of Variables

3.4.1 Gold Export - G_{et}

The researcher obtained average annual price of Gold from the Statista (2016) with head office in Hamburg in German with its branch offices in London and New York and the World Gold Council(UK). The price used as the base for estimating the average annual price for Gold. After this estimation the researcher computed the annual Gold production in kilograms multiplied with the average annual price per troy ounce where 1 kg is equivalent to 32.15 troy ounces. This provided the baseline for prediction of gold export from 1990 to 2014.Gold production was available through the Tanzania ministries and Central Bank and given in Kilograms. Bank of Tanzania had no record on gold revenue for the named period.

The researcher investigated on the following key areas first;

- Quantity of Gold produced
- Price of Gold
- Agricultural productivity and Growth
- Poverty Alleviation

The researcher looked at the contribution of Gold to GDP. This aim at examining Gold export performance for the period of the study and expressed as;

(Gold Export/Real GDP)* 100 = Contribution of Gold to GDP

Similarly the researcher also examined contribution of Gold to total export and used the following formulae;

(Gold Export/Total Export)* 100 = Contribution of Gold to Total export

This computation assisted the researcher to get an overview regarding the role of gold export to the economy of Tanzania.

3.4.2 Gold Export to Account for Agricultural Productivity and Growth

Gold export is a valuable resource stronger than ordinary currencies, when applied strategically the gold export can easily account for agricultural growth ($Agric_t$).The following were the key assumptions given the value of gold and demand to the world;

- Tanzania has larger deposits of gold resources
- Gold producers are willing to get additional taxes
- Export taxes or value added tax must be introduced on gold export
- Gold export revenue amount to a large extent must be spent in the country
- Agriculture is the only sector that employ 80% of people in Tanzania and its growth will lead for poverty alleviation in Tanzania
- Funds collected on gold export must be used directly to support agricultural development

The researcher assessed the variable gold export and agriculture productivity for the given period. Through granger causality and cointegration test provided a picture on relationship and association ship and causality. The researcher also developed theory on gold export tax push that can assist the government for decision on gold export to account for agricultural productivity and poverty alleviation in Tanzania. The theory was guided by the assumptions. The researcher computed the lost opportunity for gold tax and forecast gold export to 2030 using excel functions and suggest what should be done based on the trend 2015-2030.

3.5. Augmented Dickey Fuller (ADF)

According to Cheung and Lai (1995), explain that "Augmented Dickey Fuller or ADF is a test that is commonly used in a unit root. The author explain that ADF is used to fit in the Auto regressive model (VAR Model)." With dickey fuller

test we examine the problem of autocorrelation. In order to track the problem of autocorrelation dick fully developed a test. Sjo (2008),said that “ADF is simple to perform,use and understand than any other test of unit root”.

This is among theresearch tool test the researcher will prefer using in this study. The following key variables shall be used to test for (ADF) Gold production and export, Agriculture productivity poverty Alleviation and Economic Growth.

Therefore in “order to rule out the problem of auto correlation the researcher computed for stationary, this means that must the first differencing” Dolado and Gonzalo (2002) and determine stationarity level based on the results guided with hypotheses and decision at 5% level of significant. Cheung and Lai (1995) specify the results of each model into intercept, trend only, trend and constant, no constant no trend. Data was processed by using STATA(2009) version 11 computer software and make informed decision regarding the stationarity of the variable after the first differencing. According to Sjo (2008) point out that “when testing ADF requires some judgement on it”. The researcher was guided with the following null hypothesis;

Variables is not stationary and have unit root

3.6 Testing for Cointegration

According to Lung (2008) describes that when “linear combination of the two Y process becomes X prepare then these two arrangement are co-integrated. Co-integration suggests presence of long run harmony. With co-mix we can less demanding separate short and long run relationship among variables under estimation.” Generally the author pointed out that testing for cointegration assist in forecasting long run relationship accurately.

Therefore the researcher of this study applied different methods in assessing for cointegration mainly the augmented dick fuller test (ADF) or Dick fuller unit root test on the residual regression for cointegrating regression known as Engle Granger and the Johansen Co-integration in order to examine for long run relationship among variables under estimation. Sjo (2008) reveals that “when testing for cointegration Johansen test is recommended test because it is easier

and fit into standard modelling procedure and has good asymptotic properties. Johansen helps the researcher to examine on long run stationarity."

3.6.1 Johansen Cointegration Test

The researcher used the following variables in testing for co integration namely Gold export, Economic growth, Agriculture productivity, agriculture growth . But it is emphasized that when testing for Johansen co-integration variables must be non - stationary at the level but when the researcher converted them into first difference they must be stationary. Therefore the researcher assessed the variables like Gold production and export, Agriculture productivity poverty Alleviation and Economic Growth to examine stationarity status. The test was guided by the following null hypothesis;

H_0 : There is no cointegration among variables

3.6.2 Decision Criteria Based on Johansen Co-integration

Following the STATA output and find that the trace statistics is greater than critical value at 5% significant level we can reject the null hypothesis. If the trace statistics is less than critical value we accept the null hypothesis.

3.7 Trend Forecasting for Gold and Analysis from 2015 To 2030

The researcher examined the trend of gold export from the year 1990 to 2014 by using excel where the trend function in excel helped to predict the future of gold export covering the period 2015 to 2030 given the linearity of the gold export. Data were estimated based on the historical gold export and observation were made on how government can use forested data to develop policy that will be used to develop the agriculture and alleviating poverty.

3.8 Cost and Benefits of Agricultural Farm Requirement

The researcher also investigated the current situation of farmers on their cost and benefits of their farm investment and examined viability to establish financial gap requirements and other constraints for the investment given the status of gold export in the country. Maize farmers cost and benefits analysis was used to

examine the maize farm investment in some cases simulated and NPV formulae was applied to individual farmers and members of agricultural associations to examine this trend whether the venture on maize farm is viable and feasible or not and help probing the financial gap and requirements that farmers are facing to attain viable investment. The following was the formulae being applied to examine the situation;

$$NPV = -C_0 + C_1 \frac{1}{(1+r)} + \ldots\ldots + C_n \frac{1}{(1+r)^n}$$

Where:

C_0= Initial Capital

C_1= Cash flow in year one

C_n= Cash flow at time n

Decision Criteria

NPV < 0 Reject the maize farm investment proposal i.e not viable

NPV ≥ 0 Accept the farm Investment proposal i.e it is viable

All farmers cost and benefits were identified and analyzed to examine financial gap and needs for agricultural development given the gold export.

3.9 Population of the Study.

The study population for primary data is Tanzania with a focus of three regions of Arusha, Manyara and Mbeya distributed as follows; One ward in Karatu namely Mbulumbulu ward, two Mbulu district of (Moringa and Bargish) aiming at examining farm investment and constraint that farmers are facing mainly the maize farmers. Also Chunya district of Mbeya region and Arusha Urban were visited to get an overview regarding gold value and poverty alleviation. Gold production fields were also visited to observe gold production activities. Researcher also used time series data covering the period 1990 to 2014 to explore on causality relationship and cointegration. This help the researcher to draw policies that can help alleviate poverty in Tanzania.

3.10 Sampling Method

The main method for the sample size was a non probability sampling under judgmental sampling. The main reason of using this technique was due to limited budget, cost and accessibility of data. The actual sample size is shown here below;

3.11 SAMPLE SIZE

Given time and cost and accessibility the researcher was confined in Arusha, Manyara and Mbeya regions that included a total sample of 657, comprising a total of individuals farmers, government officers, institutions and member of agriculture associations living in Karatu namely Mbulumbulu ward, two wards of Mbulu district of (Moringa and Bargish). Arusha urban and chunya of mbeya were visited.

Table 3.1 Actual Sample Size

	Mbeya-Chunya District	Arusha urban	Karatu District (Mbulumbulu)	Mbulu District (Bargish Ants)	Mbulu District (Moringa)	Total
Individual Maize farmers	-	-	100	69	81	250
Individual staffs, Graduate brokers, local gold producers	200	157	-	-	-	357
Member of agriculture association	-	-	50	-	-	50
Total	200	157	150	69	81	657

The sample size comprised a total of 657 respondents contacted during the study period on September 2015 to March 2016.It comprise of 250 individual maize

farmers, 50 agriculture marketing cooperatives members, 357 Individual staffs, Graduate brokers, academicians, the government officers , local gold producers and other professionals.

3.12 Nature of Data

Both primary data and secondary data were used to validate the investigation on the role of gold export in agricultural development and poverty alleviation in Tanzania.

3.12.1 Primary Data.

These are those data in which the researcher gets directly from the respondents in such a way they are primary. These data were collected through group discussion, observation, interview and questionnaires to maize farmers and individuals selected under judgmental sampling given the cost accessibility and time.

The researcher collected primary data information on the current situation of farmers on their cost and benefits of their investment and examine their investment viability to establish financial gap and requirements for the investment to grow. Maize farmers cost and benefits analysis were used in this context and policy implications observed and comparison to gold export in the country. Farmer's constraints were identified that require gold export to account for it.

3.12.2 Secondary Data

The researcher collected data by using documentary review from the government sources, journals and other publications. Secondary data were collected from the reports, documents, production record, journals and other reports that were prepared and compile for the study on the role of gold export for agricultural development and poverty alleviation in Tanzania. Data from the World Bank, Bank of Tanzania, Statista, Ministry of Agriculture Food Security and Cooperatives of Mainland Tanzania, Tanzania Mineral Audit Agency (TMAA),World Gold Council, etc were collected and used in this study

3.13 Data Collection Methods

The researcher used group discussion, interview, observation, questionnaire and documentary review as methods for collecting data.

3.13.1 Interviews

An interview is an eye to eye examination or a dialog between two or more individuals. It is a data gathering strategy/system that includes oral addressing of respondents, either exclusively or as a gathering. Answers to the inquiries postured amid a meeting give the required data. For this situation, individuals included in farming activities and government officers in common assets were chosen for meeting haphazardly.

3.13.2 Observations.

Direct observation is another method that was adopted for collecting evidence captured without necessarily asking a respondents. This was possible by visiting individuals and communities around the selected regions. By direct observation method, it was possible for the researcher, to observe the physical work condition of farmers in the area involved with maize production.

3.13.3 Questionnaires

A list of questions were prepared and distributed to farmers and other individuals. Farmers questionnaires were distributed to farmers and other questionnaires were distributed to other individuals in the general public as indicated in the respondent's category. The respondents were required to fill in the questionnaires in the absence of the researcher.

CHAPTER FOUR

GOLD EXPORT AND AGRICULTURE PRODUCTIVITY: A GRANGER CAUSALITY AND COINTEGRATION

Tanzania is among the 15 world gold producing countries and gold export dominated total export to a large extent as revealed by the World Gold Council(2013) that gold from Tanzania represented 36% of total export in the year 2012 alone. This tremendously increase in gold export from Tanzania is linked to the presence of multinational who are mainly engaging in the export of gold in the form of bars and raw gold. But the country is also found to be among the poor nations of the world with lower agriculture productivity. Despite the gold export and stock statistics demonstrate that agriculture sector is continuously falling of support but it employ more than 80% of the workforce in the country also the population is growing giving more demand for food and therefore this calls for new policies that will reverse the falling trend in agriculture and this is through gold export to account for agricultural growth and productivity as validated in the granger causality and cointegration. This chapter examines granger causality and cointegration between gold export and agricultural productivity in Tanzania and formulate possible policies on the role of gold export to account for agricultural productivity and growth using Johansen cointegration and granger causality test from Tanzania with time series data from 1990 to 2014 from Tanzania where VAR and VECM models has been applied in validating the study.

4.1 Objectives

The main objective of this chapter is to examine granger causality and cointegration between gold export and agricultural productivity in Tanzania. Further the researcher examines long run and short run causality between gold export and agricultural productivity in Tanzania.

4.2 Model Specification

a) $DGETRATE_t = \beta_1 DGETRATE_{t-i} + \beta_2 DAGRICP_{t-j} + \varepsilon$

b) $DAGRICP_t = \beta_3 DAGRICP_{t-i} + \beta_4 DGETRATE_{t-i} + \mu$

- H_0 : $DAGRICP_t$ does not granger cause $DGETRATE_t$
- H_1 : $DAGRICP_t$ granger cause $DGETRATE_t$
- H_o : $DGETRATE_t$ does not granger cause $DAGRICP_t$
- H_1 : $DGETRATE_t$ granger cause $DAGRICP_t$

Where;

DAGRICP = Agricultural Productivity growth rate at time t

$DGETRATE_t$ = Gold Export growth rate at time t

μ, ε = are Error term or residual value

$\beta_1, \beta_2, \beta_3, \beta_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

4.2.1 Assumption of the Model

DAGRICP and $DGETRATE_t$ are stationary if they are not stationary we have to make them stationary to test for granger causality. It is also assumed that ε and μ are uncorrelated.

4.2.2 Decision Criteria for granger test Causality

The researcher will apply VAR model to develop test for granger causality test by using a statistical package and F- statistics shall be used in making decision to accept or reject the hypothesis at 5% level

4.3 Findings and Result

4.3.1 Unit Root Test

Data were based on the time series data for 24 observations covering the period 1990 to 2014 obtained from Tanzania and the World Bank. The first step in this study is that, data were tested for stationarity and for this case variables were differentiated to examine the stationarity properties. The Augmented dickey Fuller (ADF) was applied to perform a unit root test. The researcher applied hypotheses to guide the study on testing for unit root the results found that all the variables were valid in the model after stationarity see below figure showing the trend of the variable after stationarity.

Figure 4.1 Gold Export Growth Rate - Stationarity 1990-2014

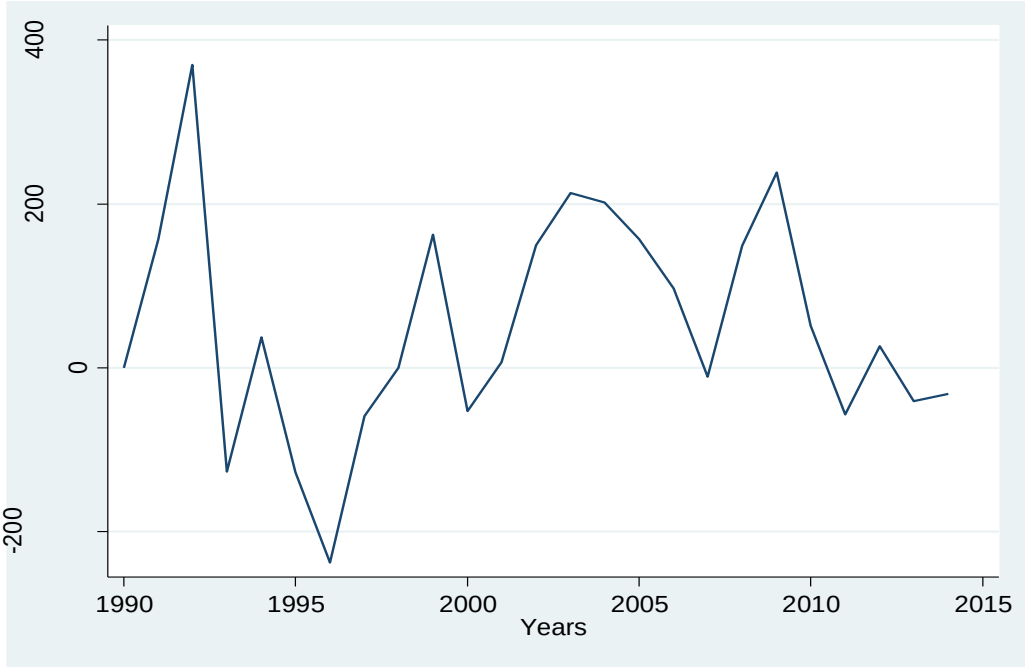
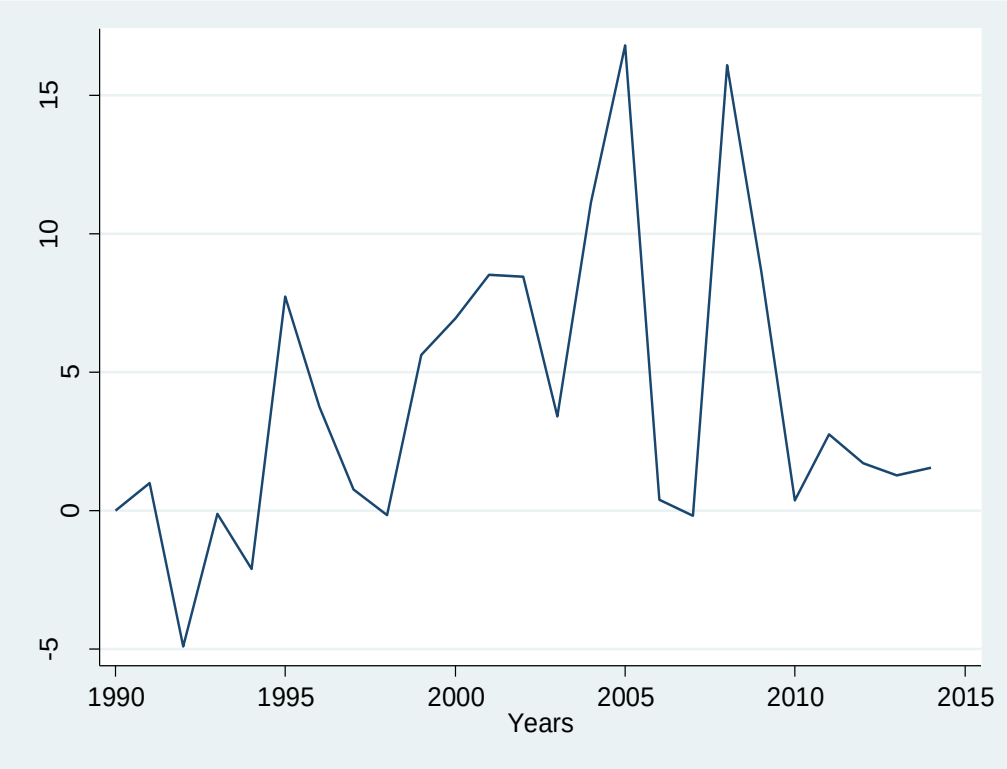


Figure 4.2 Agricultural Productivity Growth –Stationarity -1990-2014



Based on the ADF variables were tested for non stationarity to assess the stationarity variables and its associated level of significance at 5%.STATA was used to guide the test as per ADF decision criteria based on the hypothesis derived at the variable to examine whether there is stationarity or not. The two variables indicated above were found to be stationary after the first difference as shown on the figure above. Below is the table showing decision criteria based on the ADF test where intercept only, trend and intercept and no trend no intercept validate stationarity as per hypotheses.

Table 4.1 ADF Test for Agriculture Productivity Growth (Agricp)

```
. dfuller agricp, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              0.465           -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9838

------------------------------------------------------------------------------
    D.agricp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      agricp |
         L1. |   .0138566   .0297696     0.47   0.646    -.0478818    .0755951
             |
       _cons |   .0360833   8.889078     0.00   0.997    -18.39874     18.4709
------------------------------------------------------------------------------

. dfuller agricp, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -2.487           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3343

------------------------------------------------------------------------------
D.agricp        |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      agricp |
         L1. |  -.2574354   .1034947    -2.49   0.021    -.4726645   -.0422063
       _trend |   1.538947   .5679251     2.71   0.013     .3578817    2.720012
       _cons |   61.1477   23.87342     2.56   0.018     11.50021    110.7952
------------------------------------------------------------------------------

. dfuller agricp, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              3.774           -2.660            -1.950           -1.600
------------------------------------------------------------------------------

------------------------------------------------------------------------------
    D.agricp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      agricp |
         L1. |   .0139765   .0037039     3.77   0.001     .0063145    .0216385
------------------------------------------------------------------------------
```

Table 4.2 Test for Agriculture Productivity Growth (Dagricp) – After the First Difference

```
. dfuller dagricp, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -3.599            -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0058

------------------------------------------------------------------------------
   D.dagricp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dagricp |
         L1. |  -.7334974   .2038326    -3.60   0.002    -1.15622   -.3107745
             |
       _cons |   3.053891   1.374149     2.22   0.037     .2040798    5.903702
------------------------------------------------------------------------------

. dfuller dagricp, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -3.602            -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0297

------------------------------------------------------------------------------
D.dagricp       |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----------------+----------------------------------------------------------------
       dagricp  |
            L1. |  -.7815504   .2169907    -3.60   0.002    -1.232807   -.3302935
         _trend |   .1195388   .1683419     0.71   0.485    -.2305474    .4696251
          _cons |   1.755491   2.296776     0.76   0.453    -3.020916    6.531898
------------------------------------------------------------------------------

. dfuller dagricp, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -2.616            -2.660            -1.950           -1.600
------------------------------------------------------------------------------

------------------------------------------------------------------------------
   D.dagricp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dagricp |
         L1. |  -.4596523   .1757254    -2.62   0.015    -.8231681   -.0961365
------------------------------------------------------------------------------
```

Table 4.3 ADF Test for Gold Export Growth Rate (Getrate) - Before the First Difference

```
. dfuller getrate, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -0.615           -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8676

------------------------------------------------------------------------------
   D.getrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     getrate |
         L1. |  -.0365981   .0595245    -0.61   0.545    -.1600444    .0868482
             |
       _cons |   125.0345   120.7708     1.04   0.312    -125.4288    375.4978
------------------------------------------------------------------------------

. dfuller getrate, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -1.295           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8892

------------------------------------------------------------------------------
D.getrate       |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     getrate |
         L1. |  -.1464326    .113075    -1.30   0.209     -.381585    .0887197
      _trend |   9.027637   7.922244     1.14   0.267     -7.44757    25.50284
       _cons |   228.5751   150.4869     1.52   0.144    -84.37955    541.5298
------------------------------------------------------------------------------

. dfuller getrate, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             1.631           -2.660            -1.950           -1.600
------------------------------------------------------------------------------

------------------------------------------------------------------------------
   D.getrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     getrate |
         L1. |   .0232414   .0142506     1.63   0.117    -.0062381     .052721
------------------------------------------------------------------------------
```

Table 4.4 ADF Test For Gold Export Growth Rate (Dgetrate)- After The First Difference

```
. dfuller dgetrate, regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.434            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0098

------------------------------------------------------------------------------
  D.dgetrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dgetrate |
         L1. |  -.7029361   .2046824    -3.43   0.002    -1.127421   -.2784508
             |
       _cons |   36.81564   29.94895     1.23   0.232    -25.29469    98.92597
------------------------------------------------------------------------------

Dickey-Fuller test for unit root                   Number of obs   =        24

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.337            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0603

------------------------------------------------------------------------------
D.dgetrate   |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dgetrate |
         L1. |  -.7018857    .210303    -3.34   0.003    -1.139235   -.2645367
      _trend |  -.2337472   4.128453    -0.06   0.955    -8.819335    8.351841
       _cons |   39.68049   59.15896     0.67   0.510    -83.34731    162.7083
------------------------------------------------------------------------------
. dfuller dgetrate, noconstant regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.172            -2.660            -1.950            -1.600

------------------------------------------------------------------------------
  D.dgetrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dgetrate |
         L1. |  -.6096419   .1921929    -3.17   0.004    -1.007223   -.2120606
------------------------------------------------------------------------------
```

4.3.2 Vector Auto Regression Model (Var Model)

The researcher tested for VAR model through STATA (2009) to examine whether Gold export (DGETRATE) can cause agricultural productivity (DAGRICP) or agricultural productivity (DAGRICP) can cause Gold export (DGETRATE) in Tanzania. The lags selection criterion has advised me to apply 5 lags for these variables to be tested for granger causality and cointegration test.

Table 4.5 Vector Auto regression Model- Gold Export and Agriculture Productivity

Vector autoregression

Sample: 1995 - 2014		No. of obs	= 20
Log likelihood = -154.7717		AIC	= 17.67717
FPE = 214260		HQIC	= 17.89099
Det(Sigma_ml) = 18059.37		SBIC	= 18.77248

Equation	Parms	RMSE	R-sq	F	P > F
dgetrate	11	85.4103	0.7822	3.232466	0.0459
dagricp	11	5.04754	0.5480	1.09119	0.4526

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgetrate						
dgetrate						
L1.	.3819201	.2574034	1.48	0.172	-.200367	.9642071
L2.	-.3067239	.2225565	-1.38	0.201	-.8101817	.1967338
L3.	-.1663539	.1580558	-1.05	0.320	-.523901	.1911931
L4.	-.1355648	.1598933	-0.85	0.419	-.4972685	.2261388
L5.	.0437205	.153785	0.28	0.783	-.3041653	.3916063
dagricp						
L1.	7.73397	4.890139	1.58	0.148	-3.328292	18.79623
L2.	5.988198	4.911284	1.22	0.254	-5.121899	17.0983
L3.	7.046153	4.997632	1.41	0.192	-4.259277	18.35158
L4.	12.28219	4.710063	2.61	0.028	1.627287	22.93709
L5.	-4.881212	5.20349	-0.94	0.373	-16.65232	6.889899
_cons	-83.65736	46.72732	-1.79	0.107	-189.3619	22.04719
dagricp						
dgetrate						
L1.	.0180893	.0152119	1.19	0.265	-.0163224	.052501
L2.	.0092601	.0131525	0.70	0.499	-.020493	.0390131
L3.	.0084224	.0093407	0.90	0.391	-.0127077	.0295525
L4.	-.0090238	.0094493	-0.95	0.365	-.0303996	.012352
L5.	.0039749	.0090883	0.44	0.672	-.0165842	.0245341
dagricp						
L1.	.1286395	.2889949	0.45	0.667	-.5251124	.7823913
L2.	-.7147321	.2902445	-2.46	0.036	-1.371311	-.0581534
L3.	.2073612	.2953475	0.70	0.500	-.4607613	.8754836
L4.	-.1159061	.2783529	-0.42	0.687	-.7455841	.5137718
L5.	-.1287891	.3075131	-0.42	0.685	-.8244321	.566854
_cons	7.035252	2.761467	2.55	0.031	.7883787	13.28212

4.3.3 Granger Causality

Table 4.6 Granger causality - Gold Export and Agriculture Productivity

```
. vargranger

Granger causality Wald tests
```

Equation	Excluded	F	df	df_r	Prob > F
dgetrate	dagricp	3.8654	5	9	0.0379
dgetrate	ALL	3.8654	5	9	0.0379
dagricp	dgetrate	.93583	5	9	0.5017
dagricp	ALL	.93583	5	9	0.5017

The above granger Causality test is found when the data of two variables from Tanzania that is the Gold export (DGETRATE) agricultural productivity (DAGRICP) processed by using a Stata application software and the table above is the results of data processed regarding the variables and their level of significance. The following hypothesis were used to guide the study and make decision at 5% level of significant:

Case One

- H_0 : DAGRICP $_t$ does not granger cause DGETRATE $_t$
- H_1 : DAGRICP $_t$ granger cause DGETRATE $_t$

Therefore the results above demonstrate in the granger causality Wald test results that the probability value of 0.0379 or 3.79% is less than five percent significant level i.e very small, therefore we cannot reject the null hypothesis and conclude that lagged (5) agriculture productivity growth (DAGRICP $_t$) does not granger cause Gold Export(DGETRATE $_t$).

Case Two:

- H_o : DGETRATE $_t$ does not granger cause DAGRICP $_t$
- H_1 : DGETRATE $_t$ granger cause DAGRICP $_t$

Therefore the results above demonstrate in the granger causality Wald test results that the probability value of 0.5017 or 50.7% is more than 5% significant level i.e greater than 5%, therefore we reject the null hypothesis and conclude that

lagged (5) Gold Export ($DGETRATE_t$) granger cause Agriculture Productivity(DAGRICP)

4.3.4 Johansen Cointegration Test

In order to test for co integration the researcher applied Johansen Test for cointegration and was guided by the following hypotheses

H_0 : There is no cointegration among the variables gold export and agriculture productivity

H_1 : There is cointegration among the variables gold export and agriculture productivity

Based on the STATA (2009) computer software the following were the results;

Table 4.7 Johansen for Cointegration

```
. vecrank dgetrate dagricp, trend(constant) lags(5)

                       Johansen tests for cointegration
Trend: constant                                         Number of obs =      20
Sample:  1995 - 2014                                             Lags =       5
-------------------------------------------------------------------------------
                                                         5%
maximum                                      trace    critical
  rank    parms       LL       eigenvalue  statistic    value
    0      18     -173.7605         .       37.9775     15.41
    1      21    -156.32413     0.82512      3.1048*     3.76
    2      22    -154.77174     0.14379
-------------------------------------------------------------------------------
```

In running the Johansen for cointegration condition remain the same that variables have to be stationary and if they are not stationary we must make them stationary if we are to examine the relationship. Cointegration provide picture on the association among the variable that these variables are moving together or not in the long run.

The above hypothesis and the table on Johansen for cointegration reveals that when we start with 0 maximum rank is observed that the trace statistics is 37.9775 which is greater than critical value of 15.41 therefore we reject the null hypothesis that there is no cointegration among variables and we accept the alternative hypothesis that There is cointegration between gold export and

agriculture productivity. Also when there is one maximum rank at one we observe that trace statistics is 3.107434 which is less than the critical value of 3.76 at 5% significant level therefore we cannot reject the null hypothesis at one.

4.3.5 Vector Error Correction Model

The cointegration reveals that the variables are cointegrated at zero maximum rank and we reject the null hypotheses and conclude that there is cointegration between gold export and agriculture productivity. Therefore the researcher has to run for VECM model in order to examine causality in short run and long run perspective

Table 4.8 Vector Error Correction Model-Gold Export and Agriculture Productivity

Vector error-correction model

Sample: 1995 - 2014		No. of obs	= 20
		AIC	= 17.73241
Log likelihood = -156.3241		HQIC	= 17.93651
Det(Sigma_ml) = 21092.2		SBIC	= 18.77793

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_dgetrate	10	86.5847	0.7366	27.96305	0.0018
D_dagricp	10	5.12854	0.7209	25.83519	0.0040

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_dgetrate						
_ce1						
L1.	-.9012702	.3559324	-2.53	0.011	-1.598885	-.2036556
dgetrate						
LD.	.3915141	.2602969	1.50	0.133	-.1186586	.9016867
L2D.	.0898377	.1722134	0.52	0.602	-.2476943	.4273697
L3D.	-.0354222	.1616797	-0.22	0.827	-.3523086	.2814642
L4D.	-.1307226	.1349538	-0.97	0.333	-.3952273	.133782
dagricp						
LD.	-20.20147	10.09684	-2.00	0.045	-39.99092	-.4120207
L2D.	-14.25335	8.429542	-1.69	0.091	-30.77495	2.268245
L3D.	-6.177941	6.317726	-0.98	0.328	-18.56046	6.204575
L4D.	5.71558	5.221658	1.09	0.274	-4.51868	15.94984
_cons	.005278	20.10834	0.00	1.000	-39.40635	39.41691
D_dagricp						
_ce1						
L1.	.0476739	.0210824	2.26	0.024	.0063531	.0889946
dgetrate						
LD.	-.023067	.0154178	-1.50	0.135	-.0532853	.0071512
L2D.	-.0135033	.0102004	-1.32	0.186	-.0334958	.0064892
L3D.	-.0026084	.0095765	-0.27	0.785	-.021378	.0161613
L4D.	-.0092096	.0079935	-1.15	0.249	-.0248766	.0064574
dagricp						
LD.	.7661366	.5980505	1.28	0.200	-.4060209	1.938294
L2D.	.048993	.4992938	0.10	0.922	-.9296049	1.027591
L3D.	.3182817	.3742079	0.85	0.395	-.4151524	1.051716
L4D.	.1789906	.3092862	0.58	0.563	-.4271993	.7851805
_cons	.0997136	1.191046	0.08	0.933	-2.234694	2.434121

The table above reveals long run and short run causality between the variable of interest gold export and agriculture productivity.

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	1	110.5034	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
dgetrate	1	.	.	.	.	.
dagricp	-32.56398	3.097774	-10.51	0.000	-38.63551	-26.49246
_cons	117.4602	.	.	.	.	.

4.3.6 Long Run Causality

The VECM model reveals the long run causality existing between gold export and agricultural productivity in Tanzania. It reveals that the coefficient is negative at L1(Cel) showing the speed to adjust itself towards the equilibrium with a probability value of 0.011 significant at 5% level. Therefore we say that there is long run causality moving from gold export to agriculture productivity.

4.3.7 Short Run Causality

The short run causality concept was guided by the following hypothesis;

- $H_{0:}$ There is no short run causality running from Gold to agriculture productivity (L1, L2, L3, L4, L5,)
- $H_{1:}$ There is short run causality running from Gold to agriculture productivity (L1, L2, L3, L4, L5,)

Short Run Analysis

```
. test ([D_dgetrate])

 ( 1)  [D_dgetrate]L._ce1 = 0
 ( 2)  [D_dgetrate]LD.dgetrate = 0
 ( 3)  [D_dgetrate]L2D.dgetrate = 0
 ( 4)  [D_dgetrate]L3D.dgetrate = 0
 ( 5)  [D_dgetrate]L4D.dgetrate = 0
 ( 6)  [D_dgetrate]LD.dagricp = 0
 ( 7)  [D_dgetrate]L2D.dagricp = 0
 ( 8)  [D_dgetrate]L3D.dagricp = 0
 ( 9)  [D_dgetrate]L4D.dagricp = 0

           chi2(  9) =   27.93
         Prob > chi2 =    0.0010
```

Based on the above shot run output it demonstrate that the P-value is 0.0010 less than 5% significant level and therefore we reject the null hypothesis and accept

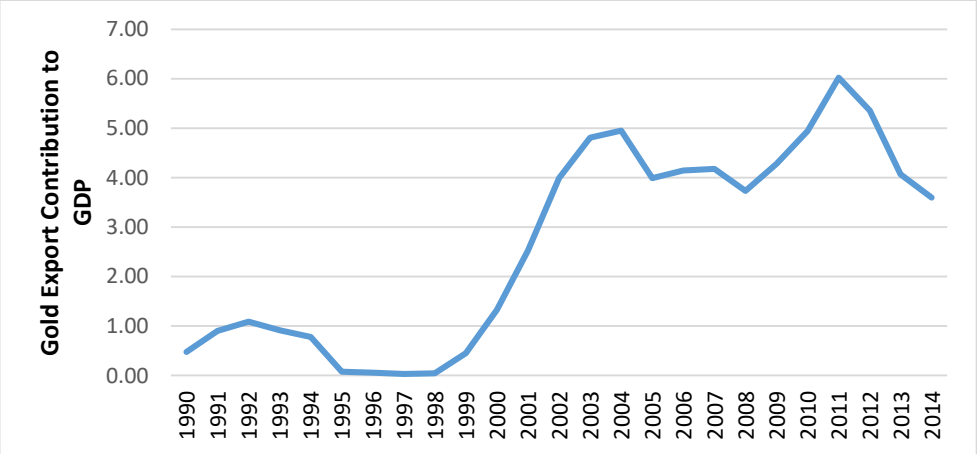
that there is short run causality running from gold export (L1, L2, L3, L4, L5, L6) to agriculture productivity.

4.3.8 Gold Export Contribution to GDP_{MP}

The researcher also looked at the contribution of Gold to GDP at market price in current US $ from the year 1990 to 2014. Gold estimates were also estimated for the same period and computed in US $ as expressed in the figure. This also aimed at examining further on the significance of gold export to GDP. The researcher applied the following simple formulae to establish the gold contribution to GDP;

(Gold Export/ GDP at Market price Current)* 100 = Contribution of Gold export to GDP

Figure 4. 3 Gold Export Contribution to GDP from 1990 to 2014



Above figure shows that gold export contribution to GDP for Tanzania during the period 1990 to 2014 has been generally increasing given the upward trend over time despite the seasonality but it is linear upward in a longer term and significant to GDP as gold alone can influence the level of GDP to the country.Data reveals that gold export contribution to GDP was lower during the period of 1990's with the lowest figure of 0.03 or 3% in 1997 then the contribution of gold export from 1998 has been positively growing reaching the maximum contribution to GDP in 2011 where it recorded the highest level of 6.02 or 60.2%% then slightly fell in 2012 to 2014 but not significant fall

reaching 3.6 or 36% as gold export contribution to GDP for Tanzania. The role of gold export to the economy should not be underestimated given the upward trend of gold export contribution to GDP to Tanzania and therefore it is high time for the government to focus on gold production and export as a strategic position for the future development.

Table 4.9 Gold Export in US $ and GDP at Current US $ from 1990-2014

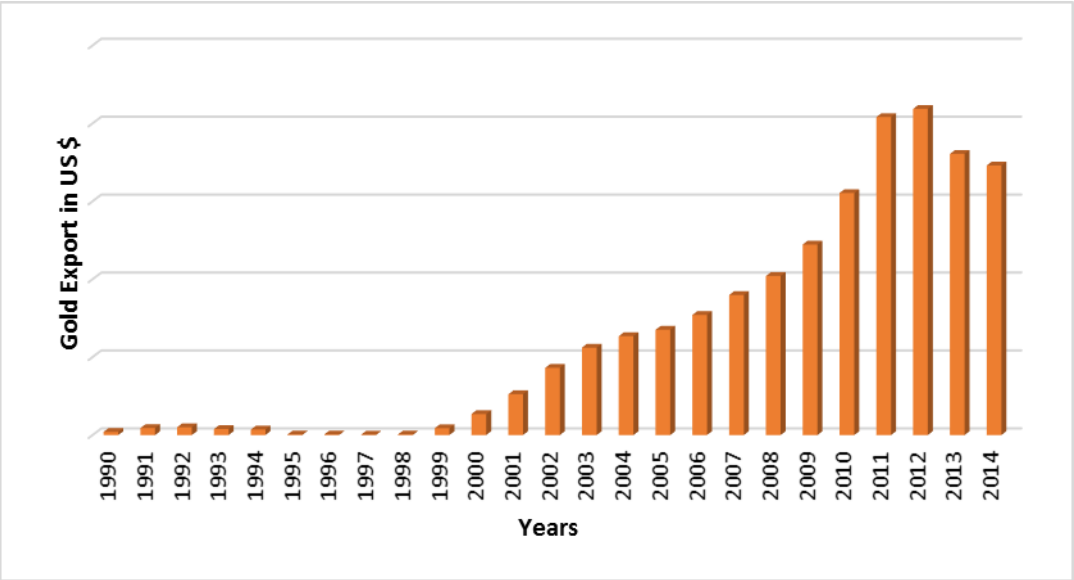
Year	Get in US $	GDP at Current US$
1990	20257937.8	4258742899
1991	44708902.71	4956588279
1992	50018503.83	4601413264
1993	38979460.54	4257702197
1994	35320761.6	4510846968
1995	3952340.96	5255221425
1996	3933773.049	6496195451
1997	2468713.624	7683852497
1998	4039341.432	9345174219
1999	43843700.88	9697847264
2000	135139200.7	10185786383
2001	262184906.4	10383560603
2002	431372740.7	10805599893
2003	560978304	11659129889
2004	634598263.6	12825801581
2005	675884942.6	16929976600
2006	771199250.3	18610460327
2007	898586400.2	21501741757
2008	1021314481	27368386358
2009	1222713546	28573777052
2010	1553014091	31407908612
2011	2040679224	33878631649
2012	2093294465	39087748240
2013	1804633295	44384603620
2014	1729807293	48056680982

The table above demonstrate the amount of gold export in US $ and GDP at Current US $ from 1990-2014 It provides the base for comparable analysis whether gold export has a role to play in the economy or not. For country like Tanzania that has gold stock the variable should not be underestimated. The government must set strategies that will plough back gold export revenue into the economy through using part of these gold export revenue to improve the agriculture sector.

4.3.9 Gold Export as Foreign Currency Gain to the Country

Gold export has been a good source of foreign currency to the economy of Tanzania as revealed in the following figure;

Figure 4.4 Gold Export

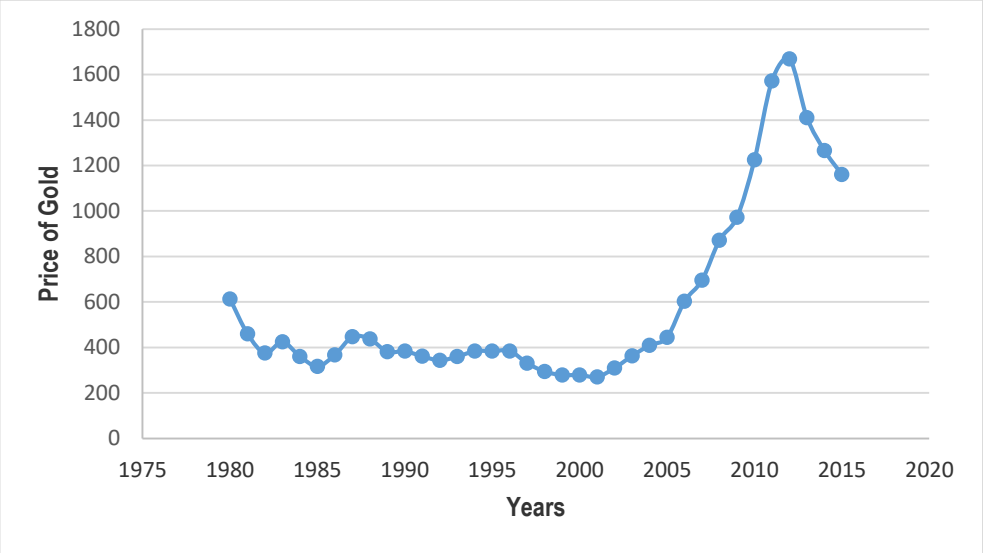


Gold export has generally been positively growing as reflected in the above figure adding to more foreign currency to the country while creating more local jobs. Despite of exporting the raw gold the contribution is important to the economy of the country mainly the GDP. During the reported period in 1990 gold export brought about US $ 20,257,938 and has been positively growing with its highest level of US $ 2,093,294,465 in the year 2012 then slightly fell in the years 2013 to 2014 but not significant fall reaching the level of US $

1,729,807,293 and US $ 1,804,633,295 respectively. The gain in the form job creation and taxes to the government even if it is a little amount of taxes where the government gets 3% of gold export and the rest goes to the gold producers and their shareholders and operating cost which is 97%.

It is evidenced that when government focus on the gold export can realize more source of foreign currency to the government and help support other sectors of the economy like agriculture sector when good policies are developed from the gold export. Gold price is stable in the world market and Tanzania must benefit more before gold is depleted.

Figure 4.5 Gold Price in US $ From 1980-2015

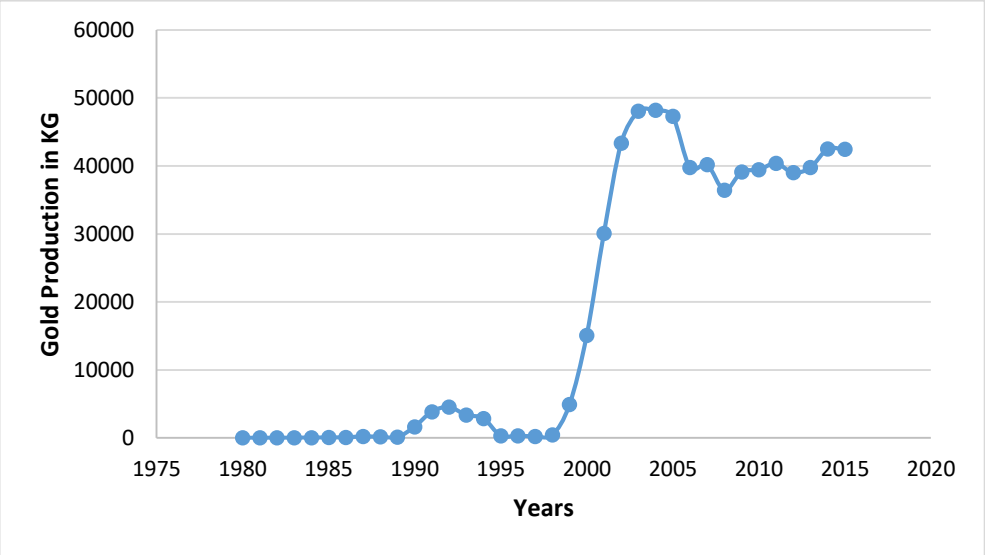


Source: Statista (2016).

The above figure demonstrates the price of Gold per ounce of US $ produced from 1980 to 2014 Statista (2016). The figure shows that the price of Gold has been positively increasing despite its fluctuations but stable from its initial of US $ 613 in 1980 and slightly fell in the following years reaching us $ 385.51 per ounce in 1990 to its maximum level of US $ 1668.98 in 2012 again slightly fell but not significant fall to US $ 1266.4 in 2014. Gold price is stable and promising given the study period. The trend in Gold price is suggested to be strong throughout years and given the scenario where Tanzania has Gold stock can benefit more to improve welfare of the people if mapped strategically with right policies that are pro-poor especially through utilizing gold revenue to improve

the agriculture sector also this acknowledged by (Mwaitete 2014) and (Mwaitete and Rastogi 2016). In general Tanzania has benefited less from gold price and trend.

Figure 4.6 Gold Production (KG) from 1980-2015



Source: Bank of Tanzania (2015)

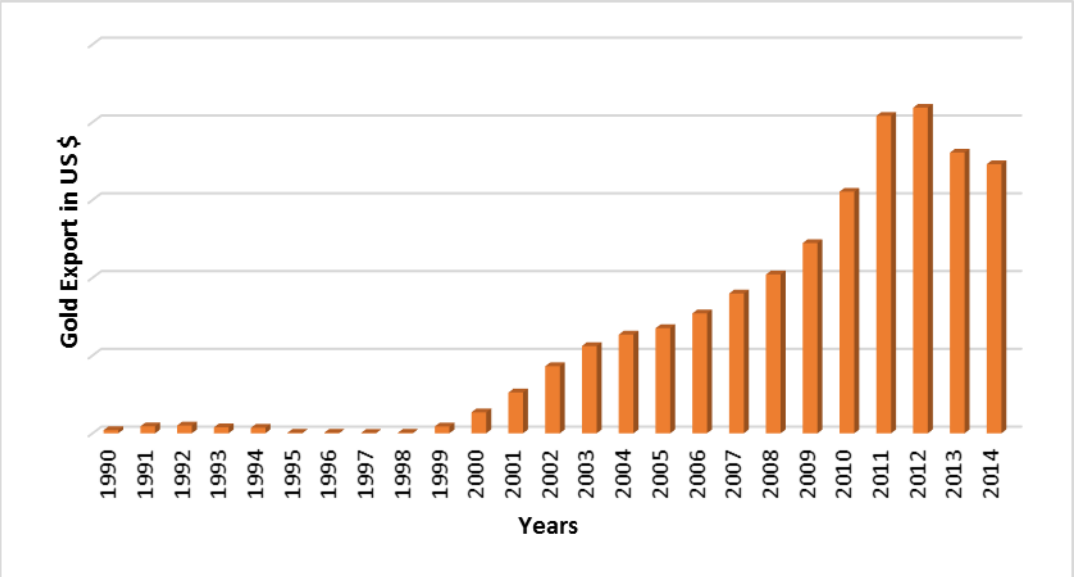
The figure above depict the production trend in Tanzania that if well mapped could have been used to rescue the agriculture sector. The trend suggest that there has been sharp increase of production during the period late 1990's with lower production in 1980's.The peak reached in 48176 Kg in 2004 alone and slightly fell down to 42486 in 2014.Generally gold production has been growing for several years now due to poor police in Tanzania that favor the gold production without any proper consideration on domestic economy and VAT on export that could be used to improve agriculture sector.

4.3.10 How Can Gold Account for Agriculture?

As pointed out in the literature that Tanzania is among the 15 world gold producing countries and gold export dominated total export to a large extent as revealed by the World Gold Council(2013) that gold from Tanzania represented 36% of total export in the year 2012 alone. Also Gold stock is money by itself Tanzania must change policies to reflect the valuable resource can be ploughed back to other sector of the economy where majority of the people dwell and this is the agriculture sector. Remember that the granger causality and cointegration

demonstrate these variable a significant when examined critically. And therefore sensitive for the economy. Given the gold export in Tanzania as shown here below and analyzed somewhere in this report please recall the gold export from 1990 to 2014 alone

Figure 4.7 Tanzania Gold Export 1990 to 2014



The contribution of gold export has not be given priority in Tanzania, the government charges 3% of gold royalty and 97% of gold export value goes abroad to where most of the key gold producer reside who actually underestimate even the level of the export values and sales.

4.3.11 What should the Government do to Control Gold Export?

Based on the granger causality and cointegration the government must use the following strategies:

4.3.12 Gold Export Tax Push

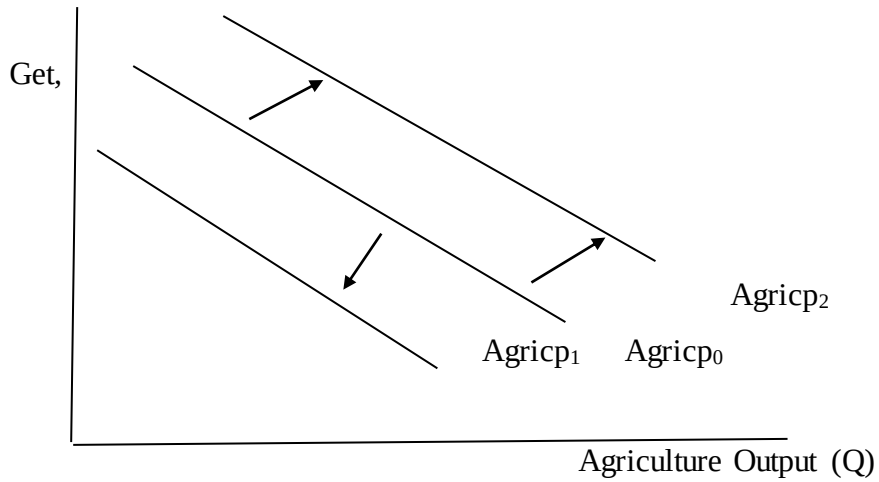
Gold export tax should be introduced since the value of gold is high and stable value than the local currency and the USA $, the government should enjoy the maximum revenue without doubt. At par with other commodities tax in Tanzania, the govt. should introduce the Tax on gold export. Gold companies will be willing to pay taxes given the stability of Gold to the world market and to the assumption that currently gold producers and sellers do not pay Value Added

Tax so introducing the export tax will be the best strategy for Tanzania to develop. Revenue received from gold export tax should be directly to mechanize agriculture in the country:

4.3.13 Assumptions on Gold Export Tax Push and Agriculture Productivity

- Value of Gold is stable throughout the period t
- Gold Producer will be willing to pay since they currently don't pay VAT on gold export
- When Initial Tax is introduced
- Additional taxes to gold exporter of raw gold and bars
- Holding Gold stock is more valuable and therefore certain control through taxes is needed
- Gold is depletable resource
- Get revenue tax shall be used for the intended purpose agriculture mechanization
- Gold is durable commodity

Figure 4.8 Gold Export Tax Push on Agriculture Productivity



Where :

Get = Gold export tax at time t

$Agricp_0$ = initial Agriculture Productivity before

$Agricp_2$ = Agriculture Productivity after Get Push

$Agricp_1$ = Agriculture Productivity when Get is reduced

The above figure shows that the government want to improve agriculture productivity and they have no alternative but to use its own available resources like gold resources that can reverse the current falling trend on the agricultural productivity in the country. At the initial Agriculture Productivity before Gold export tax at time t was $Agricp_0$ after tax consideration it push up the agricultural output to $Agricp_2$ Agriculture Productivity after Get Push now the agriculture output moves to the right because of gold export tax revenue push. When Gold export tax at time t is reduced $Agricp_1$ also is reduced.

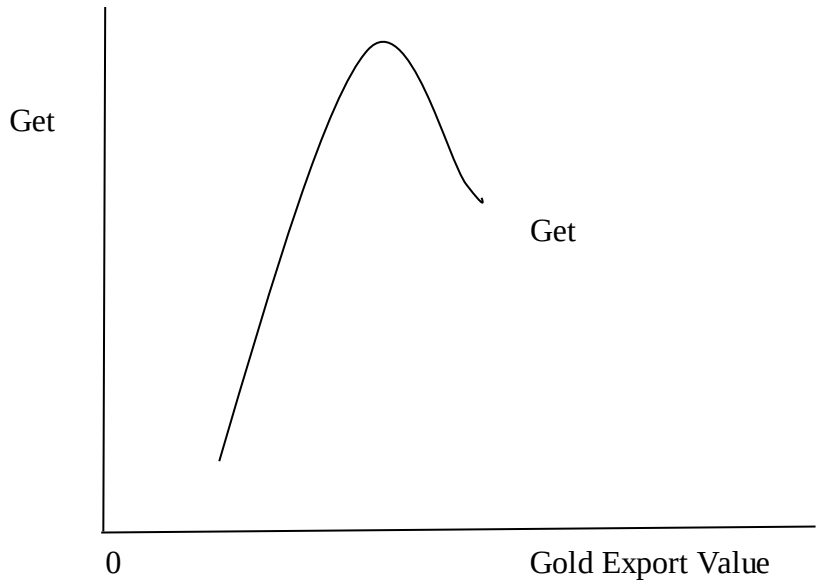
Get -Target

When agriculture productivity is increased to 80% farmers in Tanzania then livelihood shall be improved among the people and income shall be increased among the people, malnutrition shall be reduced significantly and income poverty in the society shall be generally reduced as well and this is the target of Get in agricultural development and poverty alleviation.

This is the multiplier effect of Get in alleviating poverty in Tanzania at time t_0

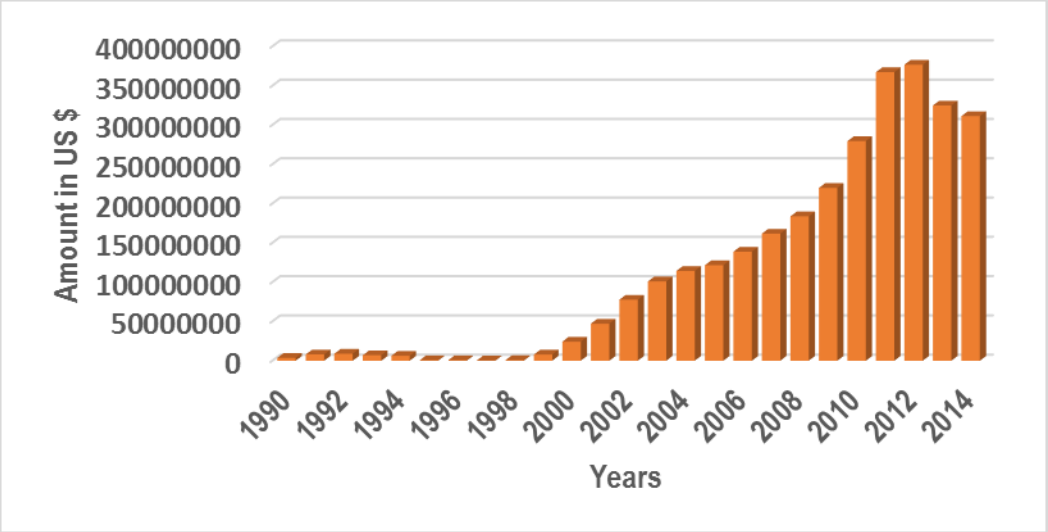
Because gold stock in Tanzania is given freely by nature and is abundant and more is to be discovered, Gold stock is also considered to be a depletable resource at time t_0. Get tend to behave as follows in the long run perspectives;

Figure 4.9 Long Run Gold Export Tax – Get



At the initial Gold Export Tax -Get will be increasing at increasing rate of Get and more revenue generated to government to finance agriculture and reaches its maximum value of Get, gold shall start diminishing because it is depletable resource and Gold Export Tax will start falling because there less gold in the long run. Therefore a great care should be introduced today through (Get) taxes needed to control depletion rate and making gold as more valuable while investing more Get revenue in agricultural development.

Figure 4.10 Tanzania lost Opportunity of Gold Export Tax Revenue and the Push to Agriculture



The above figure and the table bellows demonstrate how Tanzania has failed to capture gold export for agricultural development in the country starting from the year 1990 to 2014.The amount is in US $ and the exchange rate today is US $ 1 = Tanzania shillings 2,270 this means that Tanzania has lost a total value of

US $ 2 894 926 291 from 1990 to 2014 or this is equivalent to Tanzania shillings 6,571,482,680,570 lost opportunity to Tanzania from 1990-2014 that could have been captured to push development in the country especially in agriculture. The amount could have transformed agriculture and make sure that every village has tractors and other agricultural inputs to support farm agricultural development hence increasing the output and alleviating poverty.

The lost opportunity is also revealed in Tanzania agriculture food security and investment plan(TAFSIP) they had a clear vision to uplift the agriculture sector but it fell short of financing during the named period with a total financing gap amounting to US $ 2877Million required to improve the sector. In 2012 alone only US $ 269 million was required, 2013 was US $ 524 million, 2014 was US $ 596 million was required. Gold export could have accounted for all these. Gold export could have accounted for TAFSIP plan for agriculture and beyond.

Reference is also made from the government on the annual national budget for Tanzania shillings with public expenditure in fiscal years 2008/9 to 2011/12. It shows that the budget for the year 2008/9 was 6522 Billion but only 3.95% of agriculture expenditure was allocated by the government. In 2009/10 the national budget was 9509 billion but only 3.58% of agriculture expenditure was allocated. Furthermore in 2010/11 national budget with public expenditure of 11609 billion only 3.04% of agriculture expenditure was allocated for agriculture while in 2011/12 the total national budget was 13526 billion but 6.8% .The government fails to meet even some very basics in agriculture financing requirement of annual 10% required to be allocated for agriculture from total national budget.This demonstrate that something has to be done to rescue the situation and this is through examining the role of gold export.

Furthermore it is discovered from Tanzania that they never charge value added Tax on gold export. The value added tax is charged to other commodities that is why the researcher is proposing the government to become strong and introduce export tax to all gold export and related commodities that tax could then be used to finance agriculture directly in the country and improve livelihood among the majority of the people who account 80% of the population.

Table 4.10 Tanzania lost Opportunity of Gold Export Tax Push

Year	Annual Gold Export	Gold export Tax at 18% (Assumed)
1990	20257937.8	3646428.804
1991	44708902.71	8047602.488
1992	50018503.83	9003330.689
1993	38979460.54	7016302.896
1994	35320761.6	6357737.088
1995	3952340.96	711421.3728
1996	3933773.049	708079.1488
1997	2468713.624	444368.4523
1998	4039341.432	727081.4578
1999	43843700.88	7891866.158
2000	135139200.7	24325056.12
2001	262184906.4	47193283.15
2002	431372740.7	77647093.33
2003	560978304	100976094.7
2004	634598263.6	114227687.5
2005	675884942.6	121659289.7
2006	771199250.3	138815865
2007	898586400.2	161745552
2008	1021314481	183836606.7
2009	1222713546	220088438.4
2010	1553014091	279542536.4
2011	2040679224	367322260.2
2012	2093294465	376793003.8
2013	1804633295	324833993.1
2014	1729807293	311365312.8

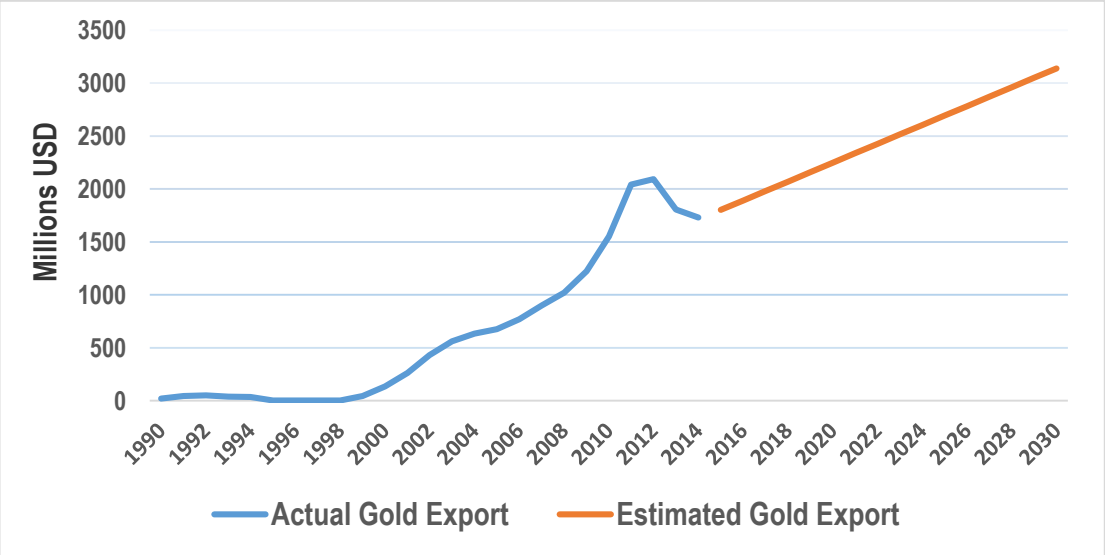
Why 18% tax is Assumed Appropriate for Gold Export Tax Push in agriculture?

All other goods and services produced locally they are compelled to pay value added tax of 18% and therefore it makes sense for the government to introduce this at the initial stage of Gold Export Tax Push for agriculture. Gold and other mines they have been exempted from value added tax for so many years and therefore lost opportunity to the government.

4.3.14 Projected Gold Export and Gold Export Tax

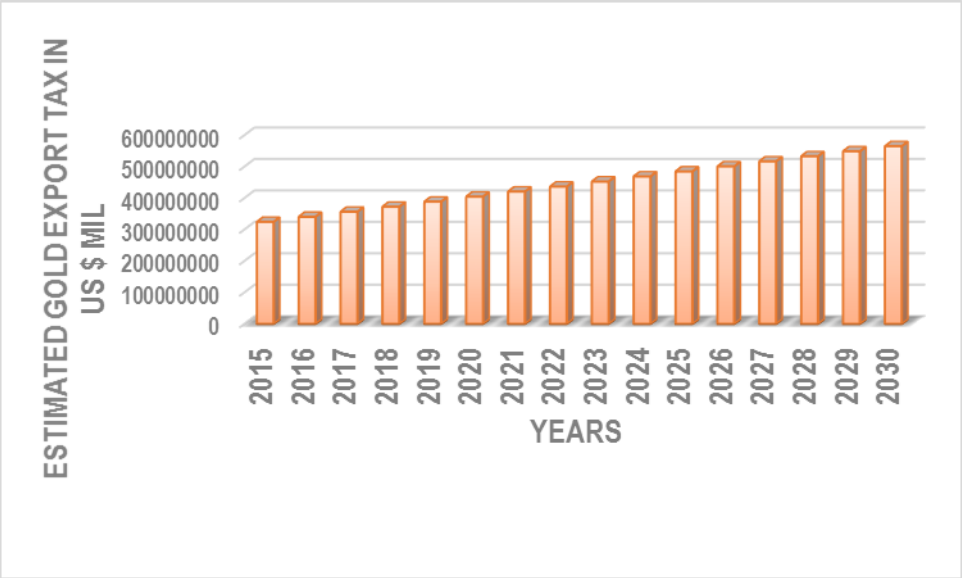
Researcher projected data based on the historical time series for the actual gold export revenues in US $ and were fixed in excel then projected. Data from 1990 to 2014 were the actual data and researcher used these data to project the trend from 2015-2030 to examine how much government should expect to collect from gold export tax given the assumed tax rate of 18% on gold export tax. The following figure shows the trend in US$

Figure 4.11 Tanzania Actual Gold Export 1990-2014 and Future Trend Gold Export 2015-2030



The above figure shows Tanzania Actual Gold Export 1990-2014 and Future Trend Gold Export 2015-2030.It reveals that gold export is positively increasing based on this estimate from the year 2015 to 2030.Initally the amount in 2018 is expected to be US $ 2,069,065,147 with a targeted gold export tax at 18%(Assumed) of US $ 37,2431,726.4. This amount is significant in setting farm investment. It is projected that these revenue will keep on increasing and reaching a total revenue US $39,520,909,221 for all projected years. This positive increase of gold export should be realized in agriculture productivity through export tax.

Figure 4.12 Projected Gold Export Tax in US $ From 2015 to 2030

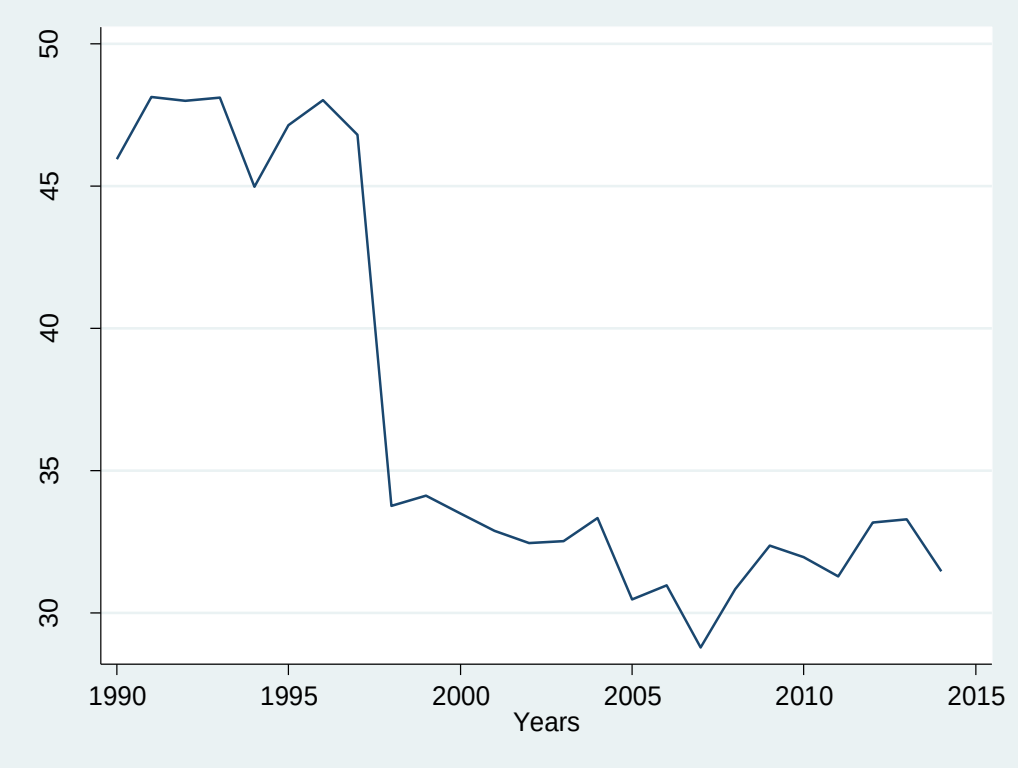


The figure above demonstrate the Gold export tax revenue trend at 18% in each year from 2015 to 2030.The figure reveals that the projected amount can be target to account for agriculture productivity and growth in Tanzania. It also reveals a positive growth trend on tax revenue if mapped properly by the government. In 2015 alone tax revenue was projected to be US$ 324,312,724.9 the amount keep on increasing US $ 404,511,060.8 in the year 2020 and continue rising and reach the peak in 2030 with estimated tax revenue of US $ 564,907,732.5.This annual amount when targeted could make revolution in agriculture in Tanzania while improving livelihood of the people, income and poverty alleviation in the country. The targeted amount can be used to improve farm technology, machines setting up farm infrastructure and agricultural inputs given the arable land. The country will be self-sufficient with food and reduced hunger among citizens. Therefore the government should decide when to implement the policy.

Understanding the Value of Gold

The government should know that value of gold is always stable that is why countries keep reserve of gold and Tanzania must apply appropriate policies that will benefit the domestic economy with multiplier effect and the gold stock should be accounted reserve in the country and there no need to set policies that will extract gold at the expense of the domestic economy like the prevailing policies.

Figure 4.13 Agriculture Productivity Share of GDP from 1990 to 2014



Source: World Bank(2015)

The above data reveals that agriculture productivity share of GDP is falling with the highest peak of 48.14% in 1991 and dropped sharply in 1997 to 33.76% continued falling and reaching 31.14 % in 2014. Among reason that contributed to this significant falls are due to poor agriculture technology and other inputs, less subsidies to farmers, lack of support from other sector of the economy like gold export revenue could be used strategically to account for agricultural

growth. Gold export tax revenue in exchange should be used to improve the agriculture sector through

- ✓ Providing farmers with modern farming tools, machines and tractors in every village where farmers reside
- ✓ Provide enough subsidies to farmers requiring support from the government including fertilizer
- ✓ Set up farm infrastructure including road and industries for farmer's value addition.
- ✓ Set up water harvest strategy, water reserve and irrigation that farming should be don the whole year round

When the above is done through utilizing gold export and taxes in short run and long run perspective then poverty shall be alleviated in Tanzania by using part of these gold export revenue to deliberately improve agriculture sector productivity in the country.

4.4 Critique on Tanzania Gold Export

Following this study the researcher observed the following key criticism on Tanzania gold export;

Based on the literature it is revealed that;

- No value addition is taken into account when considering gold export from Tanzania and therefore less gain on gold export revenue indicating that the country could gain more once value addition on gold export has been taken into account rather than the current practice where raw gold is exported to the rest of the world in the form of bars.
- Lack of gold export tax is another critique that we must look at.
- Lack of value added tax
- Less Knowledge on pricing the value of gold
- Many multinationals involved in gold export they are listed to foreign stock market like London stock market, New York stock market and others and therefore the gain from the gold export to a larger extent benefit foreign shareholders rather than the local.
- The government only charge 3% on gold export and 97% is left to investors who normally benefit the foreign economy. The left 3% is what

the government is left with for domestic economy including agriculture support.

4.5 Conclusion and Recommendations

4.5.1 Conclusion

Gold export plays a significant role in the agriculture productivity of Tanzania. This is evidenced from the findings that gold export granger cause agricultural productivity and growth. Also cointegration between gold export and agricultural productivity (at 5 lags). Also in the short run and long run gold export has causality impact on agriculture productivity VECM validate this. The more gold we export the more agricultural productivity is expected.

4.5.2 Recommendations

Gold Export Tax Revenue

In order to maximize the granger causality and cointegration approaches for long run and short run impact, Gold export tax should be introduced since the value of gold is high with stable price than the local currency and the USA $, the government should enjoy the maximum revenue and gold producers will be willing to pay since currently there is no Value Added Tax on gold export revenue.

Gold Export and Agriculture Productivity

Gold export tax revenue in exchange should be used to improve the agriculture sector through

- ✓ Providing farmers with modern farming tools, machines and tractors in every village where farmers reside
- ✓ Provide enough subsidies to farmers requiring support from the government including fertilizers
- ✓ Set up farm infrastructure including road and industries for farmer's value addition.
- ✓ Set up water harvest strategy, water reserve and irrigation that farming should be don the whole year round

The Multinationals companies exporting gold

The involvement of multinational companies in gold exploitation and export who pays 3% to the government and take 97% must be limited and those involved in gold export should not be given tax exemptions. The current Gold companies and their tax system must be reversed and make sure that large proportions of gold export income remain domestically to improve GDP in Tanzania through improving the agriculture sector.

Local Gold Miners

Government must support local small miners with technology and skills on gold exploitation and export since Tanzania is among the country with large deposit of Gold in Africa and the gold pricing is stable and promising in the world market.

The Central Bank of Tanzania

The central bank must make sure that the gold revenue to a large extent must reside in the country to help stimulate the domestic economy. Gold export value can be used to supply the nation with technological needs especially technology to support agriculture. Gold export can be used to protect the country during the economic crisis and stabilizing the economy through stable currency unlike today where there is no link to gold export and the level of economic growth. Gold is money by itself and therefore clear strategy is required on how to use gold for development

CHAPTER FIVE

GOLD PRODUCTION FOR EXPORT AND POVERTY ALLEVIATION IN TANZANIA GRANGER CAUSALITY AND COINTEGRATION

This chapter examines the gold production growth for export and poverty alleviation in Tanzania with time series data from 1990 to 2014 study period. Data collected were tested by using granger causality and cointegration for the named period. The study investigates whether gold production growth rate for export causes poverty alleviation in Tanzania or poverty alleviation causes gold production growth rate for export. The researcher uses proxy indicator namely per capita income data from 1990 to 2014 since it is a standard that is being applied to many countries regarding poverty income of the country among citizen.

5.1 Objective

The main objective of this chapter is to examine granger causality and cointegration between gold production growth rate for export and poverty alleviation in Tanzania..

5.2 Model Specification

In examining whether gold production growth rate for export causes poverty alleviation in Tanzania or poverty alleviation causes gold production growth rate for export the researcher is guided with the hypotheses and decision was based on the 5% significant level. The following is the model specification that was used for granger causality;

a) $DPVRATE_{t} = \lambda_i DGOLDPDGR_{t-i} + \lambda_2 DPVRATE_{t-j} + \varepsilon$

b) $DGOLDPDGR_{t} = \lambda_i DGOLDPDGR_{t-i} + \lambda_2 DPVRATE_{t-j} + \mu$

Case One

H_0 : Poverty alleviation rate(DPVRATE) does not granger cause Gold Production for Export (DGOLDPDGR)

H_1 : Poverty alleviation rate(DPVRATE) granger causes Gold Production for Export (DGOLDPDGR)

Case two

H_0: Gold production for export (DGOLDPDGR) does not granger causes poverty alleviation rate (DPVRATE)

H_1 : Gold production for export (DGOLDPDGR) granger causes poverty alleviation rate (DPVRATE)

Where:

DPVRATE = Poverty alleviation rate

DGOLDPDGR = Gold Production for Export

ε and μ = Error term or residual value

Λ_1 λ_2 λ_3 λ_4 = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

5.3 Decision Criteria for granger Causality

The researcher applied VAR model to develop test for granger causality by using a statistical package STATA and make decision based on the 5% level of significant in whether to accept or reject the variable and draw policy conclusion regarding granger

5.3 Findings And Results

5.3.1 Stationarity

Before running for VAR and VECM variables were tested for their stationarity and if they are not stationary we had to make them stationary through conducting the first difference of the interested variables and the researcher applied again

Augmented Dickey Fuller when testing for the stationarity. In order to make decision regarding the variables as per ADF the researcher also formulated hypotheses that guided to validate whether the variable is stationary or not at 5% significant level.

5.3.2 Stationarity for Gold Production Growth Rate for Export in Tanzania

Intercept, Model Trend and Intercept only, No Trend no Intercept

Hypothesis

H_0 : Gold production growth rate for export (DGOLDPDGR) is not stationary

H_1 : Gold production growth rate for export (DGOLDPDGR) is stationary

Table 5.1 ADF Test for Gold Production Growth Rate for Export in Tanzania

Dickey-Fuller test for unit root Number of obs = 24

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-5.586	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0000

D.dgoldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgoldpdgr L1.	-1.173111	.2100018	-5.59	0.000	-1.608628	-.7375936
_cons	-66.51859	76.71631	-0.87	0.395	-225.6185	92.58131

The table demonstrate that the test statistics is 5.586 greater than critical value of 3.000 we therefore reject the null hypotheses at 5% critical value. This means that the variable gold production growth rate for export (DGOLDPDGR) is stationary

Dickey-Fuller test for unit root — Number of obs = 24

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-5.860	-4.380	-3.600	-3.240

MacKinnon approximate p-value for Z(t) = 0.0000

D.dgoldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgoldpdgr L1.	-1.235486	.2108315	-5.86	0.000	-1.673934	-.7970374
_trend	15.10256	10.99078	1.37	0.184	-7.754018	37.95914
_cons	-258.8482	158.895	-1.63	0.118	-589.2885	71.59208

The table demonstrate that the test statistics is 5.860 greater than critical value of 3.600 we therefore reject the null hypotheses at 5% critical value. This means that the variable gold production growth rate for export (DGOLDPDGR) is stationary

Dickey-Fuller test for unit root — Number of obs = 24

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-5.549	-2.660	-1.950	-1.600

D.dgoldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgoldpdgr L1.	-1.144762	.2063188	-5.55	0.000	-1.571565	-.7179588

The table demonstrate that the test statistics is 5.549 greater than critical value of 1.950 we therefore reject the null hypotheses at 5% critical value. This means that the variable gold production growth rate for export (DGOLDPDGR) is stationary

5.3 .3 Poverty Alleviation Rate (DPVRATE)

Intercept, Model Trend and Intercept only, No Trend no Intercept

Hypothesis

H_0 : Poverty Alleviation Rate(DPVRATE) is not stationary

H_1 : Poverty Alleviation Rate(DPVRATE) is stationary

Table 5.2 ADF Test for Poverty Alleviation Rate(DPVRATE)

Dickey-Fuller test for unit root — Number of obs = 24

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.964	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0000

D.dpvrate	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dpvrate L1.	-1.379938	.1981415	-6.96	0.000	-1.790858	-.9690173
_cons	.765713	2.306251	0.33	0.743	-4.017159	5.548585

The table demonstrate that the test statistics is 6.964 greater than critical value of 3.000 we therefore reject the null hypotheses at 5% critical value. This means that the variable poverty alleviation rate(DPVRATE) is stationary

Dickey-Fuller test for unit root — Number of obs = 24

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.895	-4.380	-3.600	-3.240

MacKinnon approximate p-value for Z(t) = 0.0000

D.dpvrate	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dpvrate L1.	-1.38828	.2013466	-6.89	0.000	-1.807003	-.9695568
_trend	-.2130906	.3379578	-0.63	0.535	-.9159125	.4897312
_cons	3.435122	4.836548	0.71	0.485	-6.62303	13.49327

The table demonstrate that the test statistics is 6.895 greater than critical value of 3.600 we therefore reject the null hypotheses at 5% critical value. This means that the variable poverty alleviation rate (DPVRATE) is stationary

Dickey-Fuller test for unit root — Number of obs = 24

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-7.096	-2.660	-1.950	-1.600

D.dpvrate	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dpvrate L1.	-1.376025	.1939272	-7.10	0.000	-1.777193	-.9748557

The table demonstrate that the test statistics is 7.096 greater than critical value of 1.950 we therefore reject the null hypotheses at 5% critical value. This means that the variable poverty alleviation rate(DPVRATE) is stationary

5.3.4 Vector Auto Regression Model

The researcher applied VAR model to assess whether Gold export granger causes poverty alleviation or poverty alleviation causes gold export. The Var model was applied using a statistical package STATA for Tanzania time series data from 1990 to 2014. The researcher applied lag six based on the lag selection criteria. The following is the results of VAR model;

Table 5.3 Vector Auto Regression Model

Vector autoregression

Sample: 1996 - 2014		No. of obs	= 19
Log likelihood = -174.3086		AIC	= 21.08512
FPE = 9069908		HQIC	= 21.30384
Det(Sigma_ml) = 318864		SBIC	= 22.37751

Equation	Parms	RMSE	R-sq	F	P > F
dpvrate	13	6.49817	0.8790	3.631795	0.0621
dgoldpdgr	13	323.439	0.6224	.8240306	0.6362

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dpvrate						
dpvrate						
L1.	-.924822	.3007193	-3.08	0.022	-1.660656	-.1889884
L2.	-.8077691	.3306388	-2.44	0.050	-1.616813	.001275
L3.	-.2754823	.2416585	-1.14	0.298	-.8667992	.3158347
L4.	-.6063144	.2177595	-2.78	0.032	-1.139153	-.0734761
L5.	-.5488502	.1992413	-2.75	0.033	-1.036376	-.0613243
L6.	-.6518252	.2235213	-2.92	0.027	-1.198762	-.1048883
dgoldpdgr						
L1.	.0031363	.0090179	0.35	0.740	-.0189297	.0252022
L2.	-.0059685	.0106728	-0.56	0.596	-.0320839	.0201469
L3.	-.0062356	.0119916	-0.52	0.622	-.035578	.0231068
L4.	-.0151086	.0096894	-1.56	0.170	-.0388177	.0086005
L5.	-.0169681	.0071025	-2.39	0.054	-.0343474	.0004111
L6.	-.0040418	.0072305	-0.56	0.596	-.0217343	.0136508
_cons	.5656141	1.621272	0.35	0.739	-3.401496	4.532724
dgoldpdgr						
dpvrate						
L1.	9.011252	14.96795	0.60	0.569	-27.61399	45.6365
L2.	10.90073	16.45716	0.66	0.532	-29.36848	51.16993
L3.	17.82021	12.02826	1.48	0.189	-11.61189	47.25231
L4.	19.62343	10.83872	1.81	0.120	-6.897966	46.14482
L5.	18.11964	9.917	1.83	0.117	-6.14638	42.38567
L6.	8.729763	11.12551	0.78	0.462	-18.49337	35.9529
dgoldpdgr						
L1.	-.866648	.4488544	-1.93	0.102	-1.964955	.2316591
L2.	-.7560491	.5312255	-1.42	0.205	-2.055911	.5438128
L3.	-.3915683	.596868	-0.66	0.536	-1.852052	1.068915
L4.	-.1470237	.4822779	-0.30	0.771	-1.327115	1.033068
L5.	.0968554	.3535188	0.27	0.793	-.7681738	.9618847
L6.	.1700535	.3598919	0.47	0.653	-.7105702	1.050677
_cons	-20.50872	80.69689	-0.25	0.808	-217.9669	176.9494

5.3.5 Granger Causality

Table 5.4 Granger Causality Wald Tests

Granger causality Wald tests

Equation	Excluded	F	df	df_r	Prob > F
dpvrate	dgoldpdgr	1.956	6	6	0.2173
dpvrate	ALL	1.956	6	6	0.2173
dgoldpdgr	dpvrate	.97219	6	6	0.5132
dgoldpdgr	ALL	.97219	6	6	0.5132

Decision Rule:

As stated earlier that accept the null hypothesis when the probability value is more than 5% significance level and reject the null hypothesis when the probability value is less than 5% significance level. The following was the hypothesis that helped to validate the findings;

Case One Analysis

H_0 : Lagged(6) Poverty alleviation rate(DPVRATE) does not granger cause Gold Production for Export (DGOLDPDGR)

H_1 : Lagged(6) Poverty alleviation rate(DPVRATE) granger causes Gold Production for Export (DGOLDPDGR)

Results and Observations

The results from granger causality Wald test demonstrate that the probability value is 0.5132 greater than five percent significant level and we reject the null hypothesis and conclude that Lagged (6) Poverty alleviation rate(DPVRATE) granger causes Gold Production for Export (DGOLDPDGR)

It is observed from the results that Poverty alleviation rate (DPVRATE) granger causes Gold Production for Export. This calls for the government to set up proper strategies to alleviate poverty especially through increasing agricultural productivity. When poverty is alleviated people will start buying gold locally and using gold as a hedging instrument that can also be useful in regulation of monetary policy in the country hence promoting domestic gold exchange and market.

Case Two Analysis

H_0: Lagged(6) gold production for export (DGOLDPDGR) does not granger causes poverty alleviation rate (DPVRATE)

H_1 : Lagged(6) gold production for export (DGOLDPDGR) granger causes poverty alleviation rate (DPVRATE)

Results and Observations

The results from granger causality Wald test again reveals that the probability value is 0.2173 greater than five percent significant level and we reject the null hypothesis and conclude that Lagged (6) gold production for export (DGOLDPDGR) granger causes poverty alleviation rate (DPVRATE).

As observed from the granger causality test that gold production for export granger causes poverty alleviation this call for policy to increase more gold production with anticipation that poverty shall be reduced in Tanzania and again there must be a reasonable amount of tax on gold production for national development especially with investing the taxed amount into agriculture in order to realize good performance of poverty alleviation.

5.3.6 Johansen Test for Cointegration

Following the granger Wald test results it prompt the researcher to examine whether there is cointegration between poverty alleviation rate (DPVRATE) granger causes Gold Production for Export. This will help the researcher to examine if the variables are associated in the long run or not and the researcher applied Johansen for Cointegration as indicated in the table below and hypotheses are formulated to guide the test;

Hypothesis

H_0 : There is no cointegration between poverty alleviation rate (DPVRATE) and Gold Production for Export.

H_1 : There is cointegration among variables between poverty alleviation rate (DPVRATE) and Gold Production for Export.

Table 5.5 Johansen Test for Cointegration

Trend: constant — Number of obs = 18
Sample: 1997 - 2014 — Lags = 7

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	26	-169.57069	.	15.5434	15.41
1	29	-163.01834	0.51714	2.4387*	3.76
2	30	-161.79901	0.12671		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	26	-169.57069	.	13.1047	14.07
1	29	-163.01834	0.51714	2.4387	3.76
2	30	-161.79901	0.12671		

Results

The table above shows that at 0 maximum rank is observed that the trace statistics is 15.5434 which is greater than critical value of 15.41 therefore we reject the null hypothesis that there is no cointegration among variables at zero and accept that there is cointegration between poverty alleviation rate (DPVRATE) and Gold Production for Export. It validate that the variables have long run relationship. The variables move together in the long run.

Table 5.6 Vector Error Correction Model between Poverty Alleviation Rate and Gold Production for Export.

Vector error-correction model

Sample: 1996 - 2014		No. of obs	= 19
		AIC	= 21.48897
Log likelihood = -179.1452		HQIC	= 21.69928
Det(Sigma_ml) = 530534		SBIC	= 22.73166

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_dpvrate	12	6.06893	0.9579	159.3084	0.0000
D_dgoldpdgr	12	374.972	0.7839	25.38668	0.0131

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_dpvrate						
_ce1						
L1.	-4.845669	.9698924	-5.00	0.000	-6.746623	-2.944715
dpvrate						
LD.	2.858355	.8042685	3.55	0.000	1.282018	4.434693
L2D.	1.99996	.5740437	3.48	0.000	.8748547	3.125065
L3D.	1.699851	.4198408	4.05	0.000	.8769785	2.522724
L4D.	1.133766	.2978531	3.81	0.000	.5499847	1.717548
L5D.	.6181648	.1850297	3.34	0.001	.2555132	.9808164
dgoldpdgr						
LD.	.0601843	.0142293	4.23	0.000	.0322953	.0880733
L2D.	.0510681	.0145478	3.51	0.000	.0225549	.0795812
L3D.	.0412437	.0132235	3.12	0.002	.0153262	.0671612
L4D.	.0236857	.0094275	2.51	0.012	.0052082	.0421631
L5D.	.0051759	.0059156	0.87	0.382	-.0064184	.0167703
_cons	1.658841	1.485017	1.12	0.264	-1.251739	4.569421
D_dgoldpdgr						
_ce1						
L1.	92.85272	59.92527	1.55	0.121	-24.59865	210.3041
dpvrate						
LD.	-66.18494	49.69211	-1.33	0.183	-163.5797	31.20981
L2D.	-40.98006	35.46757	-1.16	0.248	-110.4952	28.5351
L3D.	-16.2019	25.94007	-0.62	0.532	-67.04349	34.6397
L4D.	-7.944807	18.403	-0.43	0.666	-44.01402	28.12441
L5D.	.7806656	11.43215	0.07	0.946	-21.62594	23.18727
dgoldpdgr						
LD.	-2.323712	.8791668	-2.64	0.008	-4.046847	-.6005767
L2D.	-2.190385	.8988428	-2.44	0.015	-3.952084	-.428685
L3D.	-1.56799	.8170177	-1.92	0.055	-3.169316	.0333348
L4D.	-1.022921	.5824804	-1.76	0.079	-2.164562	.1187192
L5D.	-.4905092	.3654965	-1.34	0.180	-1.206869	.2258509
_cons	.0865751	91.75249	0.00	0.999	-179.745	179.9182

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	1	2.338569	0.1262

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
dpvrate	1	.	.	.	.	.
dgoldpdgr	.0122714	.0080245	1.53	0.126	-.0034564	.0279992
_cons	.2581604	.	.	.	.	.

The above is the VECM model output demonstrating the long run and short run causality among variables poverty alleviation rate (DPVRATE) and Gold Production for Export.

5.3.7 Long Run Causality Decision Making

The normal guideline for long run suggests that when the error correction term L1 (_cel) is negative and significant then there is long run causality. When the error correction term is positive and not statistically significant to explain about long run causality at 5% level it means that there is no long run causality.
Results:

Results of Vector Error Correction Model(VECM) reveals that error correction term L1 (cel) is -4.845669 (negative) and P-Value is 0.000 significant at 5% level therefore we can say there is long run causality moving from gold production for export (DGOLDPDGR) to poverty alleviation rate (DPVRATE).This shows that the variables will be able to adjust itself towards the equilibrium at a speed of 484.5669%.

5.3.8 Short Run

The short run causality concept was guided by the following hypothesis;
$H_{0:}$ There is no short run causality running from gold production for export (DGOLDPDGR L1, DGOLDPDGR L2, DGOLDPDGR L3, DGOLDPDGR 4, DGOLDPDGR L5) to economic growth

$H_{1:}$ There is short run causality running from gold production for export (DGOLDPDGR L1, DGOLDPDGR L2, DGOLDPDGR L3, DGOLDPDGR 4, DGOLDPDGR L5) to economic growth

```
. test ([D_dpvrate])

 ( 1)  [D_dpvrate]L._ce1 = 0
 ( 2)  [D_dpvrate]LD.dpvrate = 0
 ( 3)  [D_dpvrate]L2D.dpvrate = 0
 ( 4)  [D_dpvrate]L3D.dpvrate = 0
 ( 5)  [D_dpvrate]L4D.dpvrate = 0
 ( 6)  [D_dpvrate]L5D.dpvrate = 0
 ( 7)  [D_dpvrate]LD.dgoldpdgr = 0
 ( 8)  [D_dpvrate]L2D.dgoldpdgr = 0
 ( 9)  [D_dpvrate]L3D.dgoldpdgr = 0
 (10)  [D_dpvrate]L4D.dgoldpdgr = 0
 (11)  [D_dpvrate]L5D.dgoldpdgr = 0

           chi2( 11) =  158.99
         Prob > chi2 =    0.0000
```

Above shot run output reveals that they are all zero and it demonstrate that the P-value is 0.000 less than 5% significant level and therefore we reject the null hypothesis and accept that there is short run causality running from gold production for export (DGOLDPDGR L1, DGOLDPDGR L2, DGOLDPDGR L3, DGOLDPDGRL 4, DGOLDPDGR L5) to poverty alleviation rate. Because the variables are zero.

5.4 Conclusion and Recommendations

5.4.1 Conclusion

It is revealed from the results that gold production for export granger causes poverty alleviation in Tanzania and Poverty alleviation granger causes gold Production for Export. Therefore gold production in Tanzania is a significant variable given the causality concept need for good policies to be formulated to ensure good results in poverty alleviation and gold production also the study reveals that there is cointegration between poverty alleviation rate and Gold Production for Export. It validate that the variables have long run relationship. That is to say that the variables move together in the long run. Furthermore the study prove that there is long run causality moving from gold production for export to poverty alleviation rate .This shows that the variables will be able to adjust itself towards the equilibrium at a high speed of 484.5669%.It is also revealed that the short run exist causality exist between the variables.

5.4.2 Recommendations

This study recommend the following:

- More gold should be produced to account for poverty alleviation with increased income and employment among people
- Government should set tax on gold export and that this amount of tax should be used in the development of agriculture and help farmers with tools and technology to improve farm yield in order to realize big results in poverty alleviation.
- Additional tax should be set to those individuals and companies who want to export raw gold and in the form of bar
- Local people should be empowered to produce more gold on production and export with value addition
- The government should promote domestic gold exchange and market especially when income of the people is improved people will start buying gold locally and using gold as a hedging instrument that can also be useful in regulation of monetary policy in the country hence promoting domestic gold exchange and market and attracting more gold taxes that can be used for development.

CHAPTER SIX

GOLD PRODUCTION GROWTH RATE AND GROSS DOMESTIC PRODUCT GROWTH RATE: GRANGER CAUSALITY AND COINTEGRATION IN TANZANIA

The study examine the gold production potential to gross domestic product thereby focusing at granger causality and cointegration with time series data 1990 to 2014 from Tanzania. Gold is stock and money by itself and it is a depletable resource. The more we produce without valuing it is useless to the economy of Tanzania but when knowing that one day gold shall be depleted then we must have good policies that brings high returns to gross domestic product growth rate. Increasing gold production there must be a link to the increase in GDP or both as per granger modalities. Gold production is potential to the economy of Tanzania and Tanzania is believed to be among the gold producers in Africa with huge stock of gold and more is still discovered in different part of the country. Therefore policies must be formulated to examine for granger causality and cointegration between the named variables. Possible if wrong policies are drawn then poor GDP. In order assist domestic economy there must be some observation on gold production growth rate to examine whether gold causes GDP growth rate or both and what should be done this is the answer to be explored.

6.1 Objective

The main objective of this chapter is to examine granger causality and cointegration between Gross Domestic Product Growth Rate and Gold Production Growth Rate in Tanzania.

6.2 Model Specification

The researcher collected time series data that were later on differentiated at the first difference and tested for stationarity using ADF. Then were selected based on the ADF decision criteria. After ADF criteria then the researcher formulated different hypotheses to validate granger causality and cointegration as indicated

in the findings on Gross Domestic Product Annual Growth Rate (DGDPR) and Gold Production Growth Rate (DGOLDPDGR).VAR and VECM are applied to make decision regarding granger causality and cointegration.

During the study the following model was applied in granger causality:

a) $DGDPR_t = \beta_1 DGDPR_{t-i} + \beta_2 DGOLDPDGR_{t-j} + \varepsilon$

b $DGOLDPDGR_t = \beta_3 DGOLDPDGR_{t-i} + \beta_4 DGDPR_{t-i} + \mu$

- H_0 : $DGOLDPDGR_t$ does not granger cause $DGDPR_t$
- H_1 : $DGOLDPDGR_t$ granger cause $DGDPR_t$
- H_o : $DGDPR_t$ does not granger cause $DGOLDPDGR_t$
- H_1 : $DGDPR_t$ granger cause $DGOLDPDGR_t$

Where;

$DGDPR_t$ = Gross Domestic Product Annual Growth Rate at time t

$DGOLDPDGR_t$ = Gold Production Growth Rate at time t

μ, ε = are Error term or residual value

$\beta_1, \beta_2, \beta_3, \beta_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

6.3 Assumption of the Model

DGDPR and $DGOLDPDGR_t$ are stationary if they are not stationary we have to make them stationary to test for granger causality. It is also assumed that ε and μ are uncorrelated.

Decision Criteria for granger test Causality

The researcher will apply VAR model to develop test for granger causality test by using a statistical package and F- statistics was used in making decision to accept or reject the hypothesis at 5% level.

6.4 Findings and Results

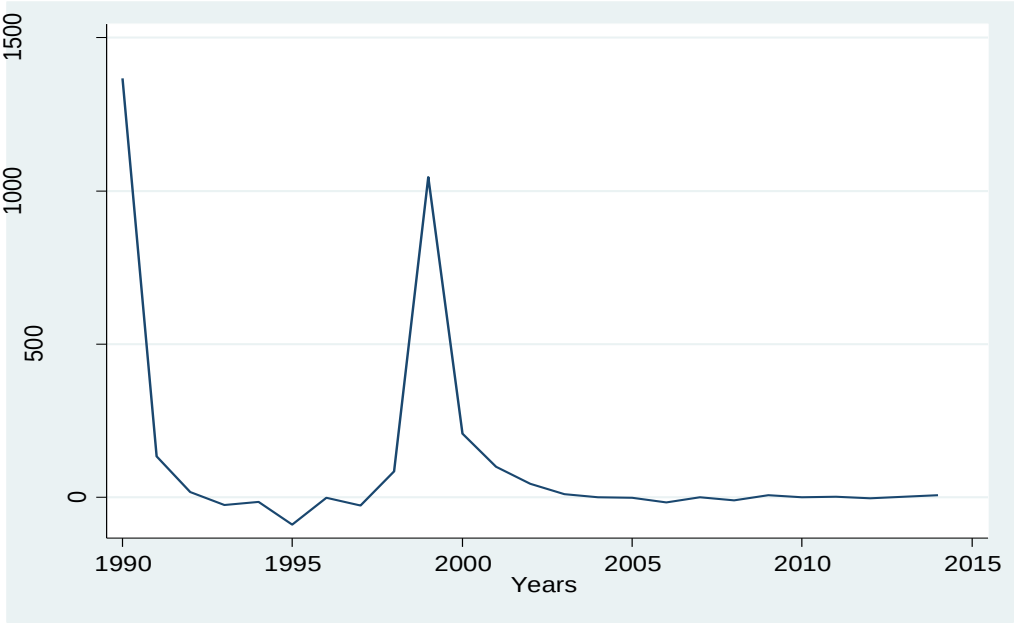
6.4.1 Unit Root Test

The research collected data for two variables Gold production growth rate and Gross domestic Product growth rate that was in the form of time series covering the period 1990 to 2014. Data for annual GDP growth rate was available through the Bank of Tanzania and the World Bank and Data for Gold production was available through the Bank of Tanzania for the named period. The researcher computer for gold production growth rate. Then collected data were tested for stationarity following the Augmented dickey Fuller (ADF) method that require all data to be stationary and when data are not stationary we have to make them stationary. In doing so the researcher applied hypothesis to test for stationarity. In real sense all data were differentiated to allow the test for stationarity among the variable as pointed out in the Augmented Dickey Fuller (ADF).The researcher was guided by the hypotheses to test for stationarity then STATA software package was applied to process the data. For the validity of the model based on the ADF process require that the variable must be valid for intercept, Model trend and intercept only, No trend no intercept. Graph also portrays the first and the second differential for stationarity

Decision Criteria for stationarity

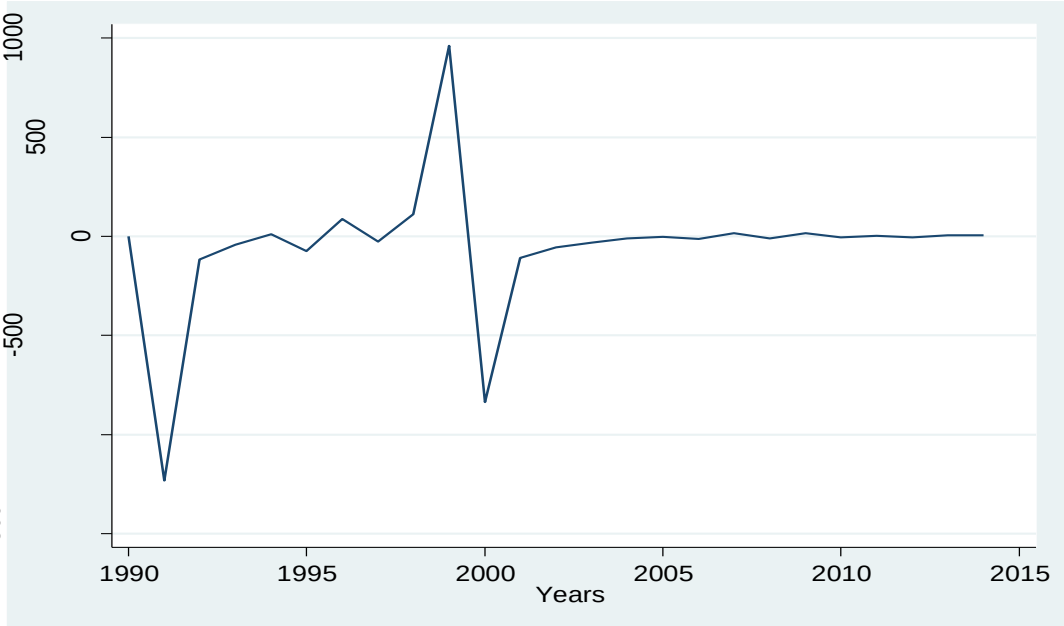
Based on the output of data when the test statistics is greater than the critical value we can reject the null hypothesis and when the test statistics is less than critical value we cannot reject the null hypotheses at 5% significant level.

Figure 6.1 Gold Production Growth Rate before the first differential (GOLDPDGR)



The above figure demonstrate a line plot of gold production growth rate before the first differential from the year 1990-2014

Figure 6.2 Gold Production Growth Rate After the first differential (DGOLDPDGR)



The above figure demonstrate a line plot of gold production growth rate after the first differential from the year 1990-2014

Figure 6.3 Gross Domestic Product Annual Growth Rate before the first differential

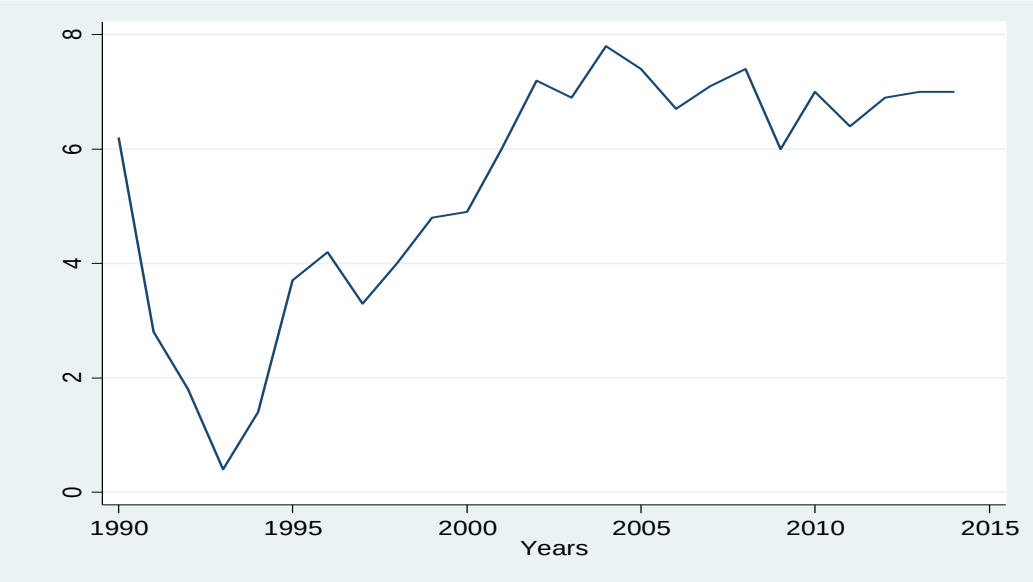
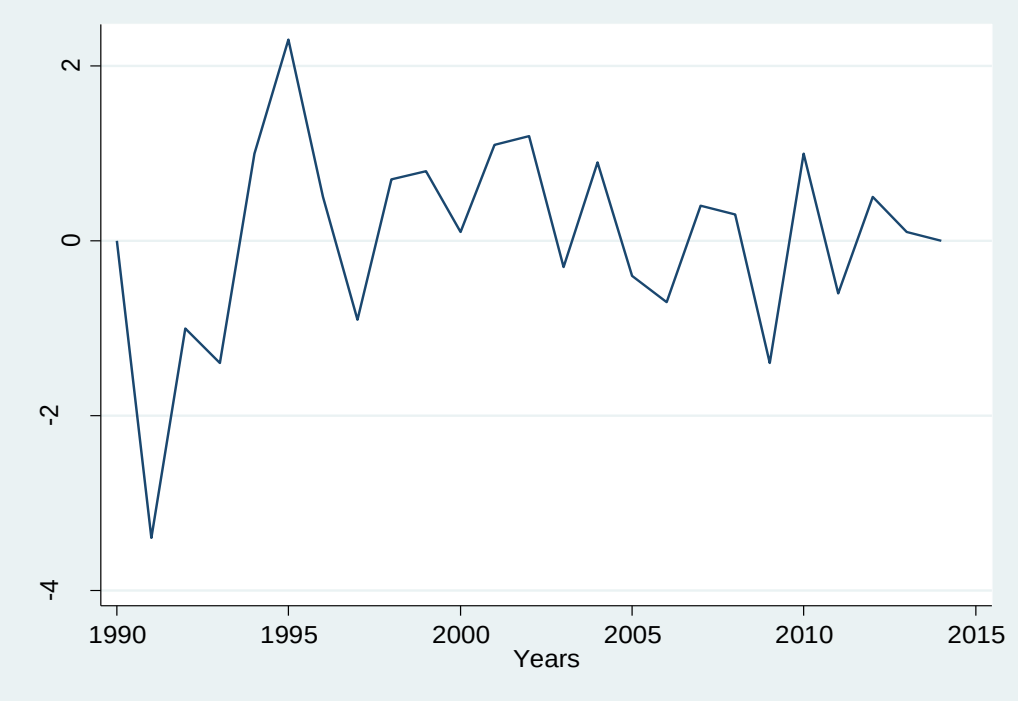


Figure 6.4 Gross Domestic Product Annual Growth Rate After the first differential - GDPR



6.4.2 ADF Test for Gold Production Growth Rate (GOLDPDGR)

Intercept, Model Trend and Intercept only, No Trend no Intercept

Gold Production Growth Rate (GOLDPDGR)

Hypothesis

H_0 : Gold Production Growth Rate is not stationary

H_1 : Gold Production Growth Rate is stationary

Table 6.1 Test for Gold Production Growth Rate (GOLDPDGR)

```
. dfuller goldpdgr, regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.598	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0000

D.goldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
goldpdgr L1.	-.8743344	.1325123	-6.60	0.000	-1.149148	-.5995207
_cons	46.68154	47.25174	0.99	0.334	-51.31256	144.6756

The intercept only demonstrate that the test statistics is 6.598 greater than critical value we therefore reject the null hypotheses at 5% critical value. This means that the variable Gold Production Growth Rate (GOLDPDGR) is stationary

```
. dfuller goldpdgr, trend regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.198	-4.380	-3.600	-3.240

MacKinnon approximate p-value for Z(t) = 0.0000

D.goldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
goldpdgr L1.	-.8940939	.1442571	-6.20	0.000	-1.194093	-.5940948
_trend	-2.74459	7.010937	-0.39	0.699	-17.32463	11.83545
_cons	83.32468	105.2791	0.79	0.438	-135.6151	302.2645

The Model trend and intercept only demonstrate that the test statistics is 6.198 greater than 3.6 critical value we therefore reject the null hypotheses at 5% critical value. This means that the variable Gold Production Growth Rate (GOLDPDGR) is stationary

```
. dfuller goldpdgr, noconstant regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.650	-2.660	-1.950	-1.600

D.goldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
goldpdgr L1.	-.830936	.124954	-6.65	0.000	-1.089423	-.572449

No trend no intercept demonstrate that the test statistics is 6.650 greater than 1.950 critical value we therefore reject the null hypotheses at 5% critical value. This means that the variable Gold Production Growth Rate (GOLDPDGR) is stationary

Base on the model above it shows that the Gold Production Growth Rate (GOLDPDGR) is stationary and looking at the coefficient of each model is negative therefore we have a valid model.

6.4.3 Gold Production Growth Rate- Differentials (DGOLDPDGR)

H_0 : DGOLDPDGR is not stationary

H_1 : DGOLDPDGR is stationary

Table 6.2 ADF Test Gold Production Growth Rate- Differentials (DGOLDPDGR)

```
. dfuller dgoldpdgr, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.586            -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

------------------------------------------------------------------------------
D.dgoldpdgr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
  dgoldpdgr |
        L1. |  -1.173111   .2100018    -5.59   0.000    -1.608628   -.7375936
            |
      _cons |  -66.51859   76.71631    -0.87   0.395    -225.6185    92.58131
------------------------------------------------------------------------------
```

The intercept only demonstrate that the test statistics is 5.586 greater than critical value 3.00 we therefore reject the null hypotheses at 5% critical value. This means that the variable Gold Production Growth Rate Differential (DGOLDPDGR) is also stationary

```
. dfuller dgoldpdgr, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.860            -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

------------------------------------------------------------------------------
D.dgoldpdgr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
  dgoldpdgr |
        L1. |  -1.235486   .2108315    -5.86   0.000    -1.673934   -.7970374
     _trend |   15.10256   10.99078     1.37   0.184    -7.754018    37.95914
      _cons |  -258.8482    158.895    -1.63   0.118    -589.2885    71.59208
------------------------------------------------------------------------------
```

Model trend and intercept only demonstrate that the test statistics is 5.586 greater than 3.600 critical value we therefore reject the null hypotheses at 5% critical value. This means that the variable Gold Production Growth Rate Differential (DGOLDPDGR) is also stationary

```
. dfuller dgoldpdgr, noconstant regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-5.549	-2.660	-1.950	-1.600

D.dgoldpdgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgoldpdgr L1.	-1.144762	.2063188	-5.55	0.000	-1.571565	-.7179588

No trend no intercept demonstrate that the test statistics is 5.549 greater than 1.950 critical value we therefore reject the null hypotheses at 5% critical value. This means that the variable Gold Production Growth Rate Differential (DGOLDPDGR) is also stationary

Both variable are valid but the researcher has applied DGOLDPDGR for the purpose of this study on granger causality and cointegration

6.4.4 Gross Domestic Product Annual Growth Rate (GDPR)

Hypothesis

H_0 : Gross Domestic Product Annual Growth Rate is not stationary

H_1 : Gross Domestic Product Annual Growth Rate is stationary

Table 6.3 ADF Test Gross Domestic Product Annual Growth Rate (GDPR)

```
. dfuller gdpr, regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-1.228	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.6612

D.gdpr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gdpr L1.	-.1374527	.111892	-1.23	0.232	-.3695024	.094597
_cons	.7624053	.6381235	1.19	0.245	-.5609819	2.085793

The table above demonstrate that the test statistics is 1.228 less than 3.000 critical value we cannot reject the null hypotheses at 5% critical value. This means that

we accept the variable Gross Domestic Product Annual Growth Rate that is not stationary.

```
. dfuller gdpr, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.339           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0601

------------------------------------------------------------------------------
D.gdpr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------+----------------------------------------------------------------------
gdpr   |
   L1. |  -.4857333   .1454893    -3.34   0.003    -.7882948   -.1831718
 _trend |   .1385621   .0440392     3.15   0.005     .0469776    .2301467
 _cons |    .877717   .5396903     1.63   0.119    -.2446304    2.000064
------------------------------------------------------------------------------
```

The table above demonstrate that the test statistics is 3.339 less than 3.600 critical value we cannot reject the null hypotheses at 5% critical value. This means that we accept the variable Gross Domestic Product Annual Growth Rate that is not stationary.

```
. dfuller gdpr, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -0.316           -2.660            -1.950           -1.600
------------------------------------------------------------------------------

------------------------------------------------------------------------------
D.gdpr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------+----------------------------------------------------------------------
gdpr   |
   L1. |  -.0131183     .04149    -0.32   0.755    -.0989469    .0727104
------------------------------------------------------------------------------
```

The table above demonstrate that the test statistics is 0.316 less than 1.950 critical value we cannot reject the null hypotheses at 5% critical value. This means that we accept the variable Gross Domestic Product Annual Growth Rate that is not stationary.

6.4.5 Gross Domestic Product Annual Growth Rate (DGDPR)

Hypothesis

H_0 : DGDPR is not stationary

H_1 : DGDPR is stationary

Table 6.4 ADF Test for Gross Domestic Product Annual Growth Rate (DGDPR)

```
. dfuller dgdpr, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.083	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0010

D.dgdpr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgdpr L1.	-.8622098	.2111671	-4.08	0.000	-1.300144	-.4242761
_cons	.0287403	.2401494	0.12	0.906	-.469299	.5267797

The table above demonstrate that the test statistics is 4.083 greater than 3.000 critical value we reject the null hypotheses at 5% critical value. This means that the variable Gross Domestic Product Annual Growth Rate is stationary.

```
. dfuller dgdpr, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.084	-4.380	-3.600	-3.240

MacKinnon approximate p-value for Z(t) = 0.0066

D.dgdpr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgdpr L1.	-.8861571	.2169568	-4.08	0.001	-1.337343	-.4349709
_trend	.0235773	.0356286	0.66	0.515	-.0505163	.097671
_cons	-.2651783	.5064128	-0.52	0.606	-1.318321	.7879648

The table above demonstrate that the test statistics is 4.083 greater than 3.600 critical value we reject the null hypotheses at 5% critical value. This means that the variable Gross Domestic Product Annual Growth Rate is stationary.

```
. dfuller dgdpr, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.172	-2.660	-1.950	-1.600

D.dgdpr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgdpr L1.	-.8614691	.2065039	-4.17	0.000	-1.288655	-.4342831

The table above demonstrate that the test statistics is 4.172 greater than 1.950 critical value we reject the null hypotheses at 5% critical value. This means that the variable Gross Domestic Product Annual Growth Rate is stationary.

6.4.6 Vector Auto Regression Model (Var Model)

The researcher tested for VAR model through STATA (2009) to examine whether Gross Domestic Product Annual Growth Rate can cause Gold Production Growth Rate or Gold Production Growth Rate can cause Gross Domestic Product Annual Growth Rate in Tanzania. The lags selection criterion has advised me to apply 6 lags for these variables to be tested for granger causality and cointegration test.

Table 6.5 Vector Auto Regression Model

Vector autoregression

Sample: 1996 - 2014		No. of obs	= 19
Log likelihood = -129.429		AIC	= 16.36094
FPE = 80523.17		HQIC	= 16.57967
Det(Sigma_ml) = 2830.893		SBIC	= 17.65333

Equation	Parms	RMSE	R-sq	F	P > F
dgdpr	13	.904639	0.4915	.4833393	0.8663
dgoldpdgr	13	256.499	0.7625	1.605286	0.2906

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dgdpr						
dgdpr						
L1.	-.0863879	.3115782	-0.28	0.791	-.8487923	.6760165
L2.	.1770511	.3035993	0.58	0.581	-.5658296	.9199317
L3.	.1133841	.2624609	0.43	0.681	-.5288347	.7556029
L4.	.1259028	.2567459	0.49	0.641	-.5023317	.7541373
L5.	-.2630038	.2508742	-1.05	0.335	-.8768709	.3508633
L6.	.2125692	.2779388	0.76	0.473	-.4675225	.8926608
dgoldpdgr						
L1.	.0002696	.0009717	0.28	0.791	-.002108	.0026472
L2.	.0005123	.0010693	0.48	0.649	-.0021041	.0031288
L3.	.0009762	.0009925	0.98	0.363	-.0014522	.0034047
L4.	.0003307	.000875	0.38	0.719	-.0018105	.0024718
L5.	.0006442	.0007566	0.85	0.427	-.0012072	.0024955
L6.	.0004501	.0007956	0.57	0.592	-.0014966	.0023969
_cons	.1480614	.3064849	0.48	0.646	-.6018802	.898003
dgoldpdgr						
dgdpr						
L1.	-27.11139	88.34403	-0.31	0.769	-243.2814	189.0587
L2.	-160.9569	86.0817	-1.87	0.111	-371.5912	49.67745
L3.	-33.66032	74.41745	-0.45	0.667	-215.7533	148.4326
L4.	90.99058	72.79701	1.25	0.258	-87.1373	269.1185
L5.	30.09102	71.13218	0.42	0.687	-143.9632	204.1452
L6.	-170.1144	78.80599	-2.16	0.074	-362.9457	22.71693
dgoldpdgr						
L1.	-.7058259	.2755049	-2.56	0.043	-1.379962	-.0316898
L2.	-.1405319	.3031827	-0.46	0.659	-.8823933	.6013295
L3.	-.1468638	.2813982	-0.52	0.620	-.8354203	.5416928
L4.	-.3480753	.2481034	-1.40	0.210	-.9551624	.2590118
L5.	-.1202186	.2145276	-0.56	0.596	-.6451487	.4047115
L6.	-.000744	.2255812	-0.00	0.997	-.5527214	.5512334
_cons	56.76223	86.89989	0.65	0.538	-155.8741	269.3986

6.4.7 Granger Causality

Table 6.6 Granger Causality Test

```
. vargranger

  Granger causality Wald tests
```

Equation	Excluded	F	df	df_r	Prob > F
dgdpr	dgoldpdgr	.25892	6	6	0.9376
dgdpr	ALL	.25892	6	6	0.9376
dgoldpdgr	dgdpr	2.1359	6	6	0.1890
dgoldpdgr	ALL	2.1359	6	6	0.1890

Following the test on granger causality the researcher observed the variables based on the granger output to examine whether Gross Domestic Product Annual Growth Rate (DGDPR) can cause Gold Production Growth Rate (DGOLDPDGR) or Gold Production Growth Rate (DGOLDPDGR) can cause Gross Domestic Product Annual Growth Rate (DGDPR) in Tanzania at lag six with time series data from 1990-2014.The following hypotheses helped the researcher to examine the tested variables;

Case One

- H_0 : Lag (6) $DGDPR_t$ does not granger cause $DGOLDPDGR_t$
- H_1 : Lag (6) $DGDPR_t$ granger cause $DGOLDPDGR_t$

It was observed from the granger causality Wald test results that the probability value of 0.1890 or 18.90% is greater than five percent level of significant therefore we reject the null hypothesis and conclude that lagged (6) Gross Domestic Product Annual Growth Rate (DGDPR) can cause Gold Production Growth Rate (DGOLDPDGR).

- H_0 : Lag(6) $DGOLDPDGR_t$ does not granger cause $DGDPR_t$
- H_1 : Lag(6) $DGOLDPDGR_t$ granger cause $DGDPR_t$

It was observed from the granger causality Wald test results that the probability value of 0.9376 or 93.76% is greater than five percent level of significant therefore we reject the null hypothesis and conclude that lagged (6) Gold

Production Growth Rate (DGOLDPDGR) can cause Gross Domestic Product Annual Growth Rate (DGDPR)

Data reveals that there is granger causality moving Gold Production Growth Rate (DGOLDPDGR) to Gross Domestic Product Annual Growth Rate (DGDPR).Likewise there is granger causality moving Gross Domestic Product Annual Growth Rate to Gold Production Growth Rate. Great care regarding policies and other implications should be formulated for better results of Gold Production Growth Rate (DGOLDPDGR) to Gross Domestic Product Annual Growth Rate (DGDPR).Researcher of this study wanted to investigate further on whether the proposed variable are moving together in the longer term association or not. In order to find out about this association the researcher tested for Johansen Cointegration. Hypotheses were also used to validate the variables.

6.4.8 Johansen Cointegration Test

In order to test for cointegration the researcher applied Johansen Test for cointegration and was guided by the following hypotheses

H_0 : There is no cointegration between Gross Domestic Product Growth Rate and Gold Production Growth Rate.

H_1 : There is cointegration between Gross Domestic Product Growth Rate and Gold Production Growth Rate.

The condition for running cointegration test under Johansen require that all data have to be stationary and in this context all data were differentiated to examine the level of stationarity and were use to test for cointegration. The following was the output:

Table 6.7 Johansen for Cointegration between Gold Production Growth Rate and Gross Domestic Product Annual Growth Rate

Johansen tests for cointegration

Trend: constant — Number of obs = 19
Sample: 1996 - 2014 — Lags = 6

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	22	-144.85135	.	30.8448	15.41
1	25	-130.78959	0.77240	2.7212*	3.76
2	26	-129.42896	0.13344		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	22	-144.85135	.	28.1235	14.07
1	25	-130.78959	0.77240	2.7212	3.76
2	26	-129.42896	0.13344		

The above is the results of Johansen for cointegration showing that when we start with 0 maximum rank is observed that the trace statistics is 30.8448 which is greater than critical value of 15.41 therefore we reject the null hypothesis that there is no cointegration among variables and we accept the alternative hypothesis that there is cointegration among variables. Also when there is one maximum rank at one we observe that trace statistics is 2.7212 which is less than the critical value of 3.76 at 5% significant level therefore we cannot reject the null hypothesis at one.

The cointegration reveals that the variables are cointegrated at zero maximum rank and we reject the null hypotheses and conclude that there is cointegration among the variables there is cointegration among the variables Gross Domestic Product Growth Rate and Gold Production Growth Rate.

6.4.9 Vector Error Correction Model

Because variable are observed to have long term association that is to that they move together in the long run, therefore this compel the researcher to run for VECM in order to investigate the level of causality in short run and long run perspectives.

Table 6.8 Vector Error Correction Model between Gold Production Growth Rate and Gross Domestic Product Annual Growth Rate

Vector error-correction model

Sample: 1996 - 2014		No. of obs	= 19
		AIC	= 16.3989
Log likelihood = -130.7896		HQIC	= 16.60922
Det(Sigma_ml) = 3266.816		SBIC	= 17.64159

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_dgdpr	12	.898614	0.8020	28.35573	0.0049
D_dgoldpdgr	12	248.329	0.9052	66.8429	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_dgdpr						
_ce1						
L1.	.0715591	.1166203	0.61	0.539	-.1570125	.3001307
dgdpr						
LD.	-.9933478	.2591726	-3.83	0.000	-1.501317	-.4853788
L2D.	-.6649429	.2505218	-2.65	0.008	-1.155957	-.1739292
L3D.	-.406978	.2566984	-1.59	0.113	-.9100977	.0961417
L4D.	-.1621756	.2437342	-0.67	0.506	-.6398858	.3155346
L5D.	-.3646846	.2259498	-1.61	0.107	-.8075382	.0781689
dgoldpdgr						
LD.	-.0018734	.0028573	-0.66	0.512	-.0074737	.0037269
L2D.	-.0015781	.0021732	-0.73	0.468	-.0058375	.0026814
L3D.	-.0007944	.0015569	-0.51	0.610	-.0038458	.002257
L4D.	-.0006336	.0011014	-0.58	0.565	-.0027923	.0015251
L5D.	-.0001588	.0007296	-0.22	0.828	-.0015887	.0012711
_cons	-.0482992	.2163797	-0.22	0.823	-.4723957	.3757972
D_dgoldpdgr						
_ce1						
L1.	-94.11986	32.22764	-2.92	0.003	-157.2849	-30.95484
dgdpr						
LD.	103.7174	71.62151	1.45	0.148	-36.65822	244.093
L2D.	-23.48458	69.23089	-0.34	0.734	-159.1746	112.2055
L3D.	-24.9005	70.93778	-0.35	0.726	-163.936	114.135
L4D.	92.60706	67.35515	1.37	0.169	-39.40662	224.6207
L5D.	136.1896	62.44051	2.18	0.029	13.80847	258.5708
dgoldpdgr						
LD.	.9884022	.789619	1.25	0.211	-.5592226	2.536027
L2D.	.7994636	.6005662	1.33	0.183	-.3776245	1.976552
L3D.	.6096542	.4302383	1.42	0.156	-.2335974	1.452906
L4D.	.2237002	.3043629	0.73	0.462	-.3728401	.8202406
L5D.	.0657075	.2016138	0.33	0.744	-.3294483	.4608632
_cons	-.000036	59.79583	-0.00	1.000	-117.1977	117.1976

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	1	22.01424	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
dgdpr	1	.	.	.	.	.
dgoldpdgr	.0288171	.0061418	4.69	0.000	.0167793	.0408549
_cons	-.1178238	.	.	.	.	.

Based on the Vector Error Correction Model – VECM it reveals the short run and long run of the variables under investigation.

6.4.10 Long Run Causality

Long run causality is observed from the vector error correction model VECM where the L1(_Cel) shows that the coefficient is positive and also not significant at 5% level. The L1(_Cel) value is 0.0715591 positive value and the P-value is 5.39 greater than 5% level of significance. Therefore we can conclude that there is no Long run Causality. Moving from Gold Production Growth Rate to Gross Domestic Product Growth Rate.

6.4.11 Short Run Causality

The short run causality concept was guided by the following hypothesis;

- $H_{0:}$ There is no short run causality running from Gold Production Growth Rate to Gross Domestic Product Growth Rate (L1, L2, L3, L4, L5, L6)
- $H_{1:}$ There is short run causality running from Gold Production Growth Rate to Gross Domestic Product Growth Rate (L1, L2, L3, L4, L5,L6)

```
. test ([D_dgdpr])

 ( 1)  [D_dgdpr]L._ce1 = 0
 ( 2)  [D_dgdpr]LD.dgdpr = 0
 ( 3)  [D_dgdpr]L2D.dgdpr = 0
 ( 4)  [D_dgdpr]L3D.dgdpr = 0
 ( 5)  [D_dgdpr]L4D.dgdpr = 0
 ( 6)  [D_dgdpr]L5D.dgdpr = 0
 ( 7)  [D_dgdpr]LD.dgoldpdgr = 0
 ( 8)  [D_dgdpr]L2D.dgoldpdgr = 0
 ( 9)  [D_dgdpr]L3D.dgoldpdgr = 0
 (10)  [D_dgdpr]L4D.dgoldpdgr = 0
 (11)  [D_dgdpr]L5D.dgoldpdgr = 0

           chi2( 11) =   28.01
         Prob > chi2 =    0.0032
```

```
. test ([D_dgoldpdgr])

 ( 1)  [D_dgoldpdgr]L._ce1 = 0
 ( 2)  [D_dgoldpdgr]LD.dgdpr = 0
 ( 3)  [D_dgoldpdgr]L2D.dgdpr = 0
 ( 4)  [D_dgoldpdgr]L3D.dgdpr = 0
 ( 5)  [D_dgoldpdgr]L4D.dgdpr = 0
 ( 6)  [D_dgoldpdgr]L5D.dgdpr = 0
 ( 7)  [D_dgoldpdgr]LD.dgoldpdgr = 0
 ( 8)  [D_dgoldpdgr]L2D.dgoldpdgr = 0
 ( 9)  [D_dgoldpdgr]L3D.dgoldpdgr = 0
 (10)  [D_dgoldpdgr]L4D.dgoldpdgr = 0
 (11)  [D_dgoldpdgr]L5D.dgoldpdgr = 0

           chi2( 11) =   66.84
         Prob > chi2 =    0.0000
```

Therefore we can conclude that Based on the above shot run output it demonstrate that the P-value is 0.0032 less than 5% significant level and therefore we reject the null hypothesis and accept that there is short run causality running from Gold Production Growth Rate (L1, L2, L3, L4, L5, L6) to Gross Domestic Product Growth Rate.

6.5 Conclusion and Recommendations

6.5.1 Conclusion

Based on the granger causality Wald test results the probability value and the level of significance at 5% the researcher found that there is granger causality moving from Gold Production Growth Rate (DGOLDPDGR) to Gross Domestic Product Annual Growth Rate (DGDPR).Likewise there is granger causality moving from Gross Domestic Product Annual Growth Rate to Gold Production Growth Rate. Great care regarding policies and other implications should be formulated for better results of Gold Production Growth Rate (DGOLDPDGR) in enhancing Gross Domestic Product Annual Growth Rate (DGDPR). The study

reveals also that there is cointegration among the variables Gross Domestic Product Growth Rate and Gold Production Growth Rate. The study found there is short run causality running from Gold Production Growth Rate (L1, L2, L3, L4, L5, L6) to Gross Domestic Product Growth Rate.

6.5.2 RECOMMENDATIONS

Based on the gold stock and production in Tanzania the study the recommend the following key point:

- The government must have great share on key gold mining companies that produce in large quantities
- Gold Produce locally must be processed locally for value chain purposes and more job opportunities
- Formalize gold markets in Tanzania through Gold commodity market and exchange
- Provide education to local people and special programmes on gold process, Gold production, Mining and marketing
- Easy gold licensing among local people and youth
- Government must support local small miners with technology and skills on gold production for the better impact of gross domestic product growth rate since Tanzania is among the country with large deposit of Gold in Africa and the gold pricing is stable and promising in the world market.
- Bank of Tanzania should buy locally produced gold to enhance reserve

CHAPTER SEVEN
AGRICULTURAL GROWTH AND ECONOMIC GROWTH A GRANGER CAUSALITY AND COINTEGRATION

This chapter examines the granger causality for the agricultural growth and economic growth in Tanzania. Time series data covering the period 1990 to 2014 were used during the study. Data collected were tested for granger causality and cointegration in examining whether economic growth causes agricultural growth or the agriculture growth causes economic growth in Tanzania.

7.1 Objective

The main objective of this chapter is to examine granger causality and cointegration between agricultural growth and economic growth in Tanzania.

7.2 Model Specification

a). $G_{r\,t} = \lambda_i \text{Agric}_{\,t-i} + \lambda_2 G_{r\,t-j} + \varepsilon$

b) $\text{Agric}_{\,t} = \lambda_i \text{Agric}_{\,t-i} + \lambda_2 G_{r\,t-j} + \mu$

H_0 : Lagged Agric does not granger cause G_r

$H_{1:}$ Lagged Agric granger cause G_r

H_0 : G_r does not granger cause Agric

H_1 : G_r granger cause Agric

Where:

Agric = Agriculture growth

G_r = Economic growth

ε and μ = Error term or residual value

$\Lambda_1\ \lambda_2\ \lambda_3\ \lambda_4$ = Are Coefficients

$_{t-i}$ and $_{t-j}$ = time lag

(μ, ε) are uncorrelated

Decision Criteria for granger test Causality

The researcher will apply VAR model to develop test for granger causality test by using a statistical package STATA and F- statistics shall be used in making decision to accept or reject the hypothesis at 5% level and draw results for policy recommendation on causality.

7.3 Findings and Results

7.3.1 Stationarity

Economic Growth Rate (G_{rT}) In Tanzania

Intercept, Model Trend And Intercept Only, No Trend No Intercept

Hypothesis

H_0 : Economic Growth Rate(G_{rT}) Is Not Stationary

H_1 : Economic Growth Rate(G_{rT}) Is Stationary

Table 7.1 ADF Test for Economic Growth Rate (G_{rT}) In Tanzania

```
. dfuller grt, regress lags(0)
Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.228            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6612

------------------------------------------------------------------------------
       D.grt |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         grt |
         L1. |  -.1374527    .111892    -1.23   0.232    -.3695024     .094597
             |
       _cons |   .7624053   .6381235     1.19   0.245    -.5609819    2.085793
------------------------------------------------------------------------------
```

The intercept only demonstrate that the test statistics is 1.228 less than critical value of 3.000 we therefore fail to reject the null hypotheses at 5% critical value. This means that the variable Economic Growth Rate (G_{rt}) is not stationary.

```
. dfuller grt, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -3.339           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0601

------------------------------------------------------------------------------
D.grt           |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----------------+-------------------------------------------------------------
grt             |
        L1.     |  -.4857333   .1454893    -3.34   0.003    -.7882948   -.1831718
      _trend    |   .1385621   .0440392     3.15   0.005     .0469776    .2301467
      _cons     |    .877717   .5396903     1.63   0.119    -.2446304    2.000064
------------------------------------------------------------------------------
```

The model trend and intercept only demonstrate that the test statistics is 3.339 less than critical value of 3.600 we therefore fail to reject the null hypotheses at 5% critical value. This means that the variable Economic Growth Rate (G_{rt}) is not stationary.

```
. dfuller grt, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -0.316           -2.660            -1.950           -1.600
------------------------------------------------------------------------------

------------------------------------------------------------------------------
       D.grt    |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----------------+-------------------------------------------------------------
grt             |
        L1.     |  -.0131183     .04149    -0.32   0.755    -.0989469    .0727104
------------------------------------------------------------------------------
```

The table demonstrate that the test statistics is 0.316 less than critical value of 1.950 we therefore fail to reject the null hypotheses at 5% critical value. This means that the variable Economic Growth Rate (G_{rt}) is not stationary.

Table 7.2 ADF Test for Economic Growth Rate –Differential

```
. dfuller dgrt, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.083            -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0010

------------------------------------------------------------------------------
       D.dgrt |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
        dgrt |
         L1. |  -.8622098   .2111671    -4.08   0.000    -1.300144   -.4242761
             |
       _cons |   .0287403   .2401494     0.12   0.906     -.469299    .5267797
------------------------------------------------------------------------------
```

The table demonstrate that the test statistics is 4.083 greater than critical value of 3.000 we therefore reject the null hypotheses at 5% critical value. This means that the variable Economic Growth Rate (G_{rt}) is stationary.

```
. dfuller dgrt, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.084            -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0066

------------------------------------------------------------------------------
D.dgrt          |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
        dgrt |
         L1. |  -.8861571   .2169568    -4.08   0.001    -1.337343   -.4349709
       _trend |   .0235773   .0356286     0.66   0.515    -.0505163    .097671
       _cons |  -.2651783   .5064128    -0.52   0.606    -1.318321    .7879648
------------------------------------------------------------------------------
```

The table demonstrate that the test statistics is 4.084 greater than critical value of 3.600 we therefore reject the null hypotheses at 5% critical value. This means that the variable Economic Growth Rate (G_{rt}) is stationary.

```
. dfuller dgrt, noconstant regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.172            -2.660            -1.950            -1.600

------------------------------------------------------------------------------
      D.dgrt |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        dgrt |
         L1. |  -.8614691   .2065039    -4.17   0.000    -1.288655   -.4342831
------------------------------------------------------------------------------
```

The table demonstrate that the test statistics is 4.172 greater than critical value of 1.950 we therefore reject the null hypotheses at 5% critical value. This means that the variable Economic Growth Rate (G_{rt}) is stationary.

Table7.3 ADF Test for Agricultural Growth Rate (Agric)

Intercept, Model Trend and Intercept only, No Trend no Intercept

Hypothesis

H_0 : Aagricultural Growth Rate (Agric) is not stationary

H_1 : Agriculturl Growth Rate (Agric) is stationary

```
. dfuller agrict, regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.260            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6474

------------------------------------------------------------------------------
    D.agrict |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      agrict |
         L1. |  -.1078058   .0855767    -1.26   0.221     -.285281    .0696695
             |
       _cons |   3.406804   3.241862     1.05   0.305    -3.316407    10.13001
------------------------------------------------------------------------------
```

The intercept only demonstrate that the test statistics is 1.260 less than critical value of 3.000 we therefore fail to reject the null hypotheses at 5% critical value. This means that the Agricultural Growth Rate (Agric) is not stationary.

The intercept only demonstrate that the test statistics is 1.650 less than critical value of 3.600 we therefore fail to reject the null hypotheses at 5% critical value. This means that the Agricultural Growth Rate (Agric) is not stationary.

```
. dfuller agrict, noconstant regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-1.204	-2.660	-1.950	-1.600

D.agrict	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
agrict L1.	-.0194913	.0161884	-1.20	0.241	-.0529795	.0139969

The intercept only demonstrate that the test statistics is 1.204 less than critical value of 1.950 we therefore fail to reject the null hypotheses at 5% critical value. This means that the Agricultural Growth Rate (Agric) is not stationary.

Table 7.4 ADF Test for Agricultural Growth Rate – Differentials (DAGRIC)

```
. dfuller dagric, regress lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        24
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.914	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0000

D.dagric	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dagric L1.	-1.049449	.2135736	-4.91	0.000	-1.492373	-.606524
_cons	-.6298547	.6427505	-0.98	0.338	-1.962838	.7031283

The table demonstrate that the test statistics is 4.914 greater than critical value of 3.00 we therefore reject the null hypotheses at 5% critical value. This means that the variable Agricultural Growth Rate (DAgric) is stationary.

The table demonstrate that the test statistics is 4.841 greater than critical value of 3.600 we therefore reject the null hypotheses at 5% critical value. This means that the variable Agricultural Growth Rate (DAgric) is stationary.

```
. dfuller dagric, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        24

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              -4.821            -2.660            -1.950           -1.600
------------------------------------------------------------------------------

------------------------------------------------------------------------------
    D.dagric |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      dagric |
         L1. |  -1.012736   .2100803    -4.82   0.000    -1.44732   -.5781515
------------------------------------------------------------------------------
```

The table demonstrate that the test statistics is 4.821 greater than critical value of 1.950 we therefore reject the null hypotheses at 5% critical value. This means that the variable Agricultural Growth Rate (DAgric) is stationary.

7.3.2 Vector Auto Regression Model

VAR model was tested by using a statistical package STATA to examine whether economic growth causes agriculture growth or the agriculture growth (Agric) causes economic growth(Grt) in Tanzania. Based in this scenario lag six was used by the researcher as advised in the lag selection criteria by using STATA when testing for granger causality and cointegration. The following is the output for the VAR model here below;

Table 7.5 Vector Auto Regression Model between Economic Growth and Agricultural Growth

Vector autoregression

Sample: 1996 - 2014 No. of obs = 19
Log likelihood = -28.82737 AIC = 5.771302
FPE = 2.027206 HQIC = 5.990026
Det(Sigma_ml) = .071269 SBIC = 7.063692

Equation	Parms	RMSE	R-sq	F	P > F
grt	13	.504841	0.8416	2.657514	0.1197
agric	13	1.77532	0.8997	4.484301	0.0384

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
grt						
grt						
L1.	-.4500168	.2404454	-1.87	0.110	-1.038365	.1383319
L2.	.1022371	.2817011	0.36	0.729	-.5870606	.7915348
L3.	.1214981	.1745263	0.70	0.512	-.3055523	.5485485
L4.	-.3786305	.2384307	-1.59	0.163	-.9620494	.2047884
L5.	-.5373191	.1694048	-3.17	0.019	-.9518378	-.1228004
L6.	.4415215	.2408967	1.83	0.117	-.1479314	1.030974
agric						
L1.	-.2238405	.0748847	-2.99	0.024	-.4070769	-.0406042
L2.	-.1265274	.0652691	-1.94	0.101	-.2862352	.0331804
L3.	-.0008181	.0891062	-0.01	0.993	-.2188532	.2172169
L4.	-.0478128	.0458877	-1.04	0.338	-.1600958	.0644703
L5.	-.0913281	.0456969	-2.00	0.093	-.2031444	.0204882
L6.	-.0495162	.0520045	-0.95	0.378	-.1767666	.0777341
_cons	-.0913161	.1634621	-0.56	0.597	-.4912934	.3086612
agric						
grt						
L1.	1.758393	.8455511	2.08	0.083	-.3105957	3.827382
L2.	.2460712	.990631	0.25	0.812	-2.177916	2.670058
L3.	-2.689108	.6137397	-4.38	0.005	-4.190875	-1.187341
L4.	-2.229127	.8384663	-2.66	0.038	-4.28078	-.1774742
L5.	1.651397	.5957296	2.77	0.032	.1936993	3.109095
L6.	.7818867	.8471381	0.92	0.392	-1.290986	2.854759
agric						
L1.	-.464796	.2633399	-1.77	0.128	-1.109166	.1795735
L2.	.6402441	.2295256	2.79	0.032	.0786151	1.201873
L3.	.1761874	.3133513	0.56	0.594	-.5905555	.9429303
L4.	-.1390496	.1613687	-0.86	0.422	-.5339046	.2558055
L5.	-.0314944	.1606979	-0.20	0.851	-.424708	.3617191
L6.	-.1863794	.1828791	-1.02	0.347	-.6338683	.2611095
_cons	-.2323209	.5748313	-0.40	0.700	-1.638882	1.174241

7.3.3 Granger Causality

Table 7:6 Granger Causality Wald Tests between Economic Growth and Agricultural Growth

```
. vargranger

   Granger causality Wald tests
```

Equation	Excluded	F	df	df_r	Prob > F
grt	agric	3.0424	6	6	0.1008
grt	ALL	3.0424	6	6	0.1008
agric	grt	7.915	6	6	0.0118
agric	ALL	7.915	6	6	0.0118

Decision Rule:

Accept the null hypothesis when the probability value is more than 5% significance level and reject the null hypothesis when the probability value is less than 5% significance level. In this case the researcher formulated hypotheses to validate the study under investigation

Hypothesis

In order to examine whether economic growth causes agricultural growth or the agricultural growth(Agric) causes economic growth(Grt) in Tanzania with time series data 1990-2014 the researcher was guided by the key hypothesis to examine the causality as reflected in the above output;

Case One Hypothesis

H_0 : Lagged(6) agricultural growth(agric) does not granger cause economic growth(Grt)

H_1 : Lagged(6) agricultural growth(agric) granger causes economic growth(Grt)

Based on the hypothesis and the table above for the granger causality wald test we therefore find that the probability value is 0.1008 greater than five percent significant level and we reject the null hypothesis and conclude that Lagged(6) agricultural growth(agric) granger causes economic growth(Grt).

Case Two Hypothesis

H_0 : Lagged(6) economic growth(Grt) does not granger cause agricultural growth(agric)

H_1: Lagged(6) economic growth(Grt) granger causes agricultural growth(agric)

The results from the granger causality wald test reveals that the probability value is 0.0118 less than 5% significant level therefore we cannot the reject the null hypothesis at 5% and accept that Lagged(6) economic growth(Grt) does not granger cause agricultural growth(agric).

But it is realized from the granger causality that there it exist between the variables as revealed above therefore the researcher will continue testing for cointegration. In this context the researcher used Johansen test for cointegration as shown here bellows:

7.3.4 Johansen for Cointegration

Table 7.7 Johansen for Cointegration

Johansen tests for cointegration

Trend: constant — Number of obs = 19
Sample: 1996 - 2014 — Lags = 6

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	22	-40.486266	.	23.3178	15.41
1	25	-32.098192	0.58644	6.5417	3.76
2	26	-28.827367	0.29128		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	22	-40.486266	.	16.7761	14.07
1	25	-32.098192	0.58644	6.5417	3.76
2	26	-28.827367	0.29128		

Hypothesis

H_0 : There is no cointegration between economic growth(Grt) and agricultural growth(agric)

H_1 : There is cointegration between economic growth(Grt) and agricultural growth(agric)

When we start with 0 maximum rank is observed that the trace statistics is 23.3178 which is greater than critical value of 14.07 therefore we reject the null hypothesis that there is no cointegration among variables at zero. Also there is cointegration at 1 maximum rank since the trace statistics is 6.5417 which is greater than critical value of 3.76 also we reject the null hypothesis that there is no cointegration among variables at zero and conclude that there is cointegration among variables. In this context we can say that the two variables namely the economic growth (Grt) and agricultural growth (agric) are cointegrated based on the results of Johansen. They have long run relationship. These variables move the same direction in the long run.

7.3.5 Vector error correction model (VECM)

The results demonstrate that economic growth(Grt) and agricultural growth(agric) are cointegrated therefore it gives a logic that the researcher can now run VECM to examine long run causality as shown here under;

Table 7.8 Vector Error Correction Model

Vector error-correction model

Sample: 1997 - 2014	No. of obs	=	18
	AIC	=	3.926132
Log likelihood = -6.335186	HQIC	=	4.123928
Det(Sigma_ml) = .0069304	SBIC	=	5.36062

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_grt	14	.365069	0.9789	185.9079	0.0000
D_agric	14	1.32846	0.9821	218.8577	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_grt						
_ce1						
L1.	-1.046892	.3383342	-3.09	0.002	-1.710015	-.3837692
grt						
LD.	.1674266	.3041918	0.55	0.582	-.4287785	.7636316
L2D.	.977323	.3879465	2.52	0.012	.2169619	1.737684
L3D.	1.064374	.3202559	3.32	0.001	.436684	1.692064
L4D.	-.060997	.1773621	-0.34	0.731	-.4086203	.2866262
L5D.	-1.078653	.2200122	-4.90	0.000	-1.509869	-.6474374
L6D.	.0718249	.211937	0.34	0.735	-.343564	.4872137
agric						
LD.	.121931	.1700393	0.72	0.473	-.2113399	.455202
L2D.	-.0278328	.1305454	-0.21	0.831	-.283697	.2280314
L3D.	.1976455	.103878	1.90	0.057	-.0059517	.4012427
L4D.	.1889273	.0836146	2.26	0.024	.0250457	.3528088
L5D.	.075473	.0621167	1.22	0.224	-.0462735	.1972194
L6D.	.0558013	.0390496	1.43	0.153	-.0207345	.1323371
_cons	-.0405123	.1080594	-0.37	0.708	-.2523049	.1712802
D_agric						
_ce1						
L1.	-4.618638	1.231172	-3.75	0.000	-7.031691	-2.205584
grt						
LD.	4.650243	1.106931	4.20	0.000	2.480698	6.819787
L2D.	4.689109	1.411708	3.32	0.001	1.922213	7.456005
L3D.	2.206093	1.165387	1.89	0.058	-.0780237	4.490209
L4D.	-1.012325	.645407	-1.57	0.117	-2.277299	.2526496
L5D.	-1.808942	.8006074	-2.26	0.024	-3.378104	-.2397802
L6D.	-1.424662	.7712225	-1.85	0.065	-2.936231	.0869061
agric						
LD.	.7462354	.6187601	1.21	0.228	-.4665121	1.958983
L2D.	.6044803	.4750446	1.27	0.203	-.32659	1.535551
L3D.	.8195669	.3780043	2.17	0.030	.0786921	1.560442
L4D.	.8665803	.3042671	2.85	0.004	.2702278	1.462933
L5D.	.6659936	.2260378	2.95	0.003	.2229676	1.10902
L6D.	.23211	.1420985	1.63	0.102	-.0463979	.510618
_cons	.0091828	.39322	0.02	0.981	-.7615141	.7798797

The above is the VECM model output demonstrating the long run and short run causality among variables the economic growth and agriculture growth.

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	1	157.3533	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
grt	1	.	.	.	.	.
agric	.5614644	.0447594	12.54	0.000	.4737375	.6491912
_cons	.0884333	.	.	.	.	.

7.3.6 Long Run Causality Guideline

The guideline suggests that when the error correction term L1 (_cel) is negative and significant then there is long run causality. When the error correction term is positive and not statistically significant to explain about long run causality at 5% level it means that there is no long run causality.

Therefore based on the results of Vector Error Correction Model(VECM) the researcher observe that error correction term L1 (cel) is -1.046892 negative and P-Value is 0.002 significant at 5% level therefore we can conclude that there is long run causality moving from agricultural growth (agric) to economic growth (Grt).This shows that the variables will be able to adjust itself towards the equilibrium at a speed of 104.6%.

9.3.7 Short Run Causality

The short run causality concept was guided by the following hypothesis;

$H_{0:}$ There is no short run causality running from agricultural growth (Agric L1, Agric L2, AgricL3, AgricL4, Agric L5, L6 to economic growth

$H_{1:}$ There is short run causality running from agricultural growth (Agric L1, Agric L2, AgricL3, AgricL4, Agric L5,L6 to economic growth

The following was the results

```
. test ([D_grt])

 ( 1)  [D_grt]L._ce1 = 0
 ( 2)  [D_grt]LD.grt = 0
 ( 3)  [D_grt]L2D.grt = 0
 ( 4)  [D_grt]L3D.grt = 0
 ( 5)  [D_grt]L4D.grt = 0
 ( 6)  [D_grt]L5D.grt = 0
 ( 7)  [D_grt]L6D.grt = 0
 ( 8)  [D_grt]LD.agric = 0
 ( 9)  [D_grt]L2D.agric = 0
 (10)  [D_grt]L3D.agric = 0
 (11)  [D_grt]L4D.agric = 0
 (12)  [D_grt]L5D.agric = 0
 (13)  [D_grt]L6D.agric = 0

           chi2( 13) =  185.80
         Prob > chi2 =    0.0000
```

Based on the above shot run output it demonstrate that the P-value is 0.000 less than 5% significant level and therefore we reject the null hypothesis and accept that there is short run causality running from agricultural growth (Agric L1, Agric L2, AgricL3, AgricL4, Agric L5, L6) to economic growth. Because the variables are zero.

7.4 Conclusion And Recommendations

7.4.1 Conclusion

Agricultural growth plays a significance roles in promoting the economic growth in the country given the time series data 1990 to 2014 at 6 lag. Tested variables found that Lagged(6) agricultural growth(agric) causes economic growth(Grt) economic growth granger cause agricultural growth(agric) therefore significant to consider the right formulation of policies in the economy. Also it is found that the two variables are cointegrated and they have long run relationship. These variables move together in the long run. It indicates that the more we increase agricultural output the more the economic growth will be. The country will have more available food, more income, employment and lower prices and therefore agriculture is significant given the Long run and short run causality.

7.4.2 Recommendations

The study recommend the following;

- Increase agricultural inputs and to farmers like tractors, pesticides and fertilizers

- The government must use imported technology in agricultural innovation and technology to increase agricultural production
- Government must supply farmers with quality seeds and fertilizer that assure farmers with high level of output.
- Infrastructure for modern farming with tools must be developed to ensure underground water and irrigation is taped for the agricultural development
- It is suggested that the government must prepare for the big push with subsidies to support all farmers engaging into agricultural activities.
- Special seminars and training to farmers on commercial agriculture must be promote and facilited by the government officers.Timely market information to farmers must be provided through appropriety channels in the country.
- Use gold export and revenue to account for agricultural growth in the country through introducing special taxes on gold export or VAT allocated for agricultural development.

CHAPTER EIGHT

THE PARADOX OF GOLD EXPLOITATION AND EXPORT IN TANZANIA: A QUALITATIVE APPROACH

Gold is a national survivors and this is reflected in the World Bank as Gold reserves. The reserve of so many countries is kept in the form of Gold and those countries with higher Gold reserve have the very high opportunity for developing their economy given the reserve amount. Stability in Gold price and value calls for Gold reserve rather than currency reserve. Also in times of world economic crisis, gold has been used as an asset to protect individuals and their nations from economic shocks. But in Tanzania the value of Gold is not known among many citizens as reflected in the primary data of this research. Government, commercial Banks individuals and companies hold Gold so that it can assist them from economic crisis and inflation and exchange rate fluctuations. That is why the world economic crisis in the developed nations has drawn attention to African gold and Tanzania gold this is the paradox and lost opportunity to domestic economy.

The number of FDI is increasing and many multinational are engaged in the exploitation of gold and other natural resources in Tanzania of which many Tanzania do not have value with or the value is not known exactly among people. The gold stock, value, production and export needs to account for agricultural development because in agriculture is where many poor people depend their livelihood and income.

8.1 Objective

The main objective of this chapter is to examine critically on the paradox of Gold value, exploitation and export in the development of the economy of Tanzania. The researcher would like to examine the value of Gold among people living in Tanzania, significance of gold in poverty alleviation and investigate the involvement of multinational in Gold exploitation.

8.2 DATA AND METHODOLOGY

The findings in this paper represent the primary data collection and secondary data collection in validating the study on the paradox of Gold exploitation in Africa the case of Tanzania where gold is claimed to be abundant and Tanzania is among the third gold producer in African but the country is still among the poorest in the world and this is a paradox. To start with the primary data collection findings were based on the pilot data collection when investing Gold resource in Tanzania. Questionnaires and interview were used to get data on primary sources for the period of September 2015 to March 2016.

In this analysis, there were a total of 500 respondents who were contacted out of which a total of 357 provided their feedback through questionnaire and interview. This shows a response rate of 71.4% which is significant to validate the study. Findings from interview and questionnaire were also supplemented by observations. The table below summarizes responses members of graduates community, academicians, students of higher learning, business community, small scale gold producers and individuals from Arusha Urban and Mbeya in Chunya district.

Table 8.1 Respondents Distribution and Categories

S/no	Region/District	Distribution	Respondents		Percent
			Expected	Actual	
1	Arusha urban	Graduates, Staffs, Academicians, Students and business community	250	157	62.8
2	Mbeya - Chunya District	Small Scale Gold Producers, Gold Brokers and individuals	250	200	80
Total			500	357	71.4

8.3 Data Analysis and Results

8.3.1 Gender Distribution

Table 8.2 Gender Distribution

S/N	Gender	Mbeya -Chunya	Arusha-Urban	Total
1	Male	150	96	246
2	Female	50	61	111
	TOTAL	200	157	357

The above table demonstrates the gender distribution for two regions of Mbeya in Chunya district and Arusha Urban who were served with questionnaires and interview regarding the role of Gold for the economy of Tanzania.There were 150 males in mbeya chunya representing 60.97% of all males and 50 females representing 45.05% who reponded questionnaires and interview.In Arusha there were 96 males representing 39.02% of all males for two regions and 61 of females representing 54.955% who provided their feedback through questionnairs and interview.

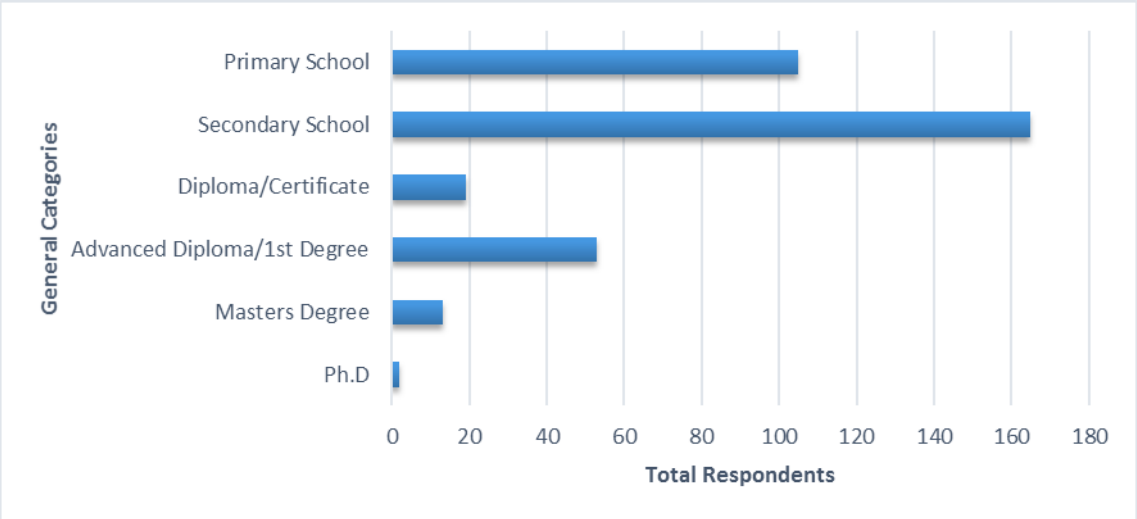
8.3.2 Level of Education

Table 8.3 Level of Education Among Respondents

S/N	Category	Mbeya-Chunya	Arusha-Urban	Total
1	Ph.D	-	2	2
2	Masters Degree	2	11	13
3	Advanced Diploma/1st Degree	3	50	53
4	Diploma/Certificate	5	14	19
5	Secondary School	120	45	165
6	Primary School	70	35	105
	Total	200	157	357

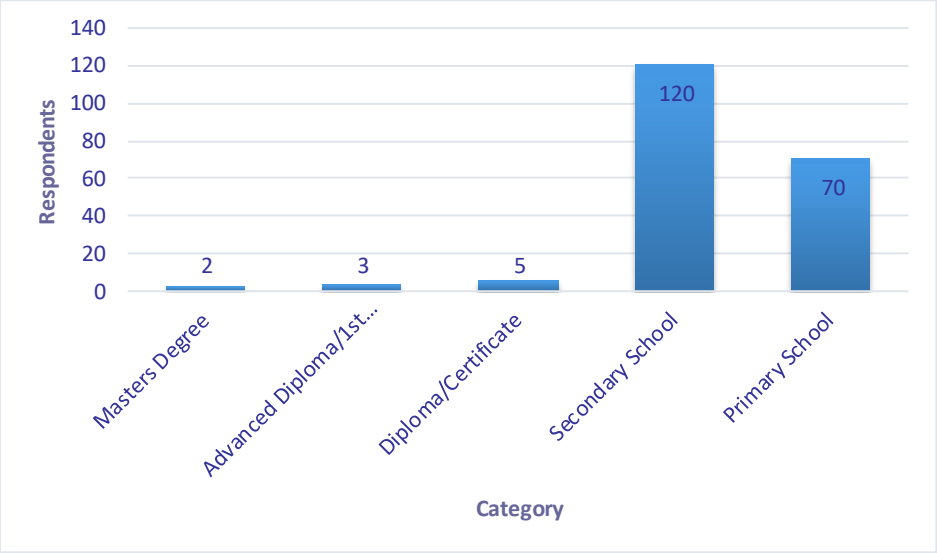
The above table demonstrate the level of education of the respondent from the two regions of Mbeya in chunya district and Arusha urban on the role of Gold for the economy of Tanzania and how it is exploited.This can also be presented in the form of figure as;

Figure 8.1 Total Level of Education Among Respondents in General



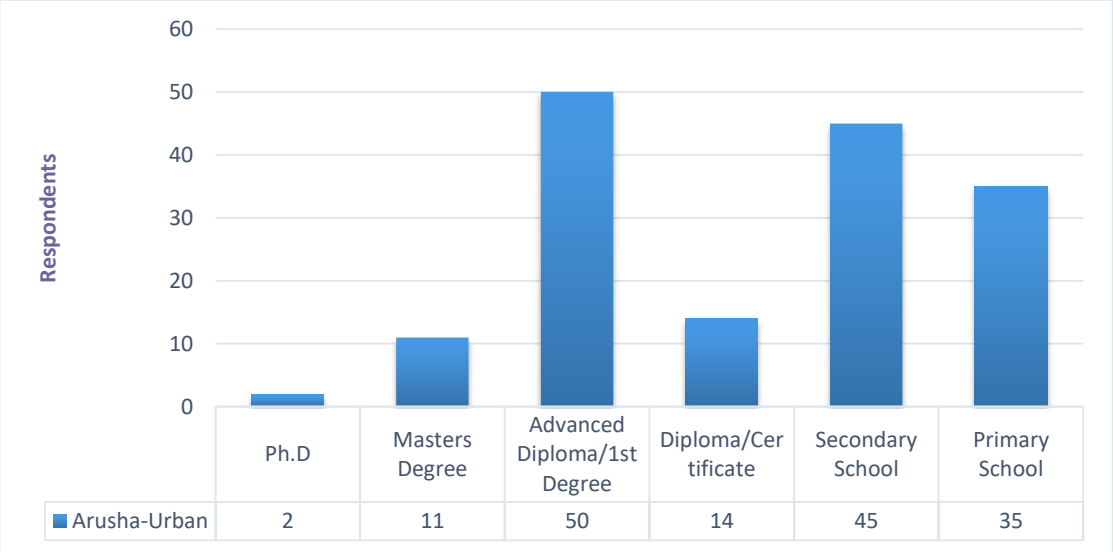
Above figure summarize the findings from the key informants who provided valuable information regarding Gold exploitation and export.Their level of education in general the secondary schools was the highest respondents who accounted 165(46%) of respondents followed by primary school level with 105(29%) of respondents. Advanced Diploma or people with their 1st Degree and Ordinary Diploma acoounted only 15% and 5% respectively. People with masters represented 4% of respondents and PhD respondents accounted 1% of total respondents for both Mbeya and Arusha.Respondents from each region is shown here below:

Figure 8.2 Level of Education for Mbeya in Chunya Respondents



The above table shows that among the main repondents and their level of education who provided their response from mbeya in Chunya district the secondary school levels representing 120(60%) respondents in Chunya was the highest then followed with the primary school levels who accounted 70(35%) respondents.Non of the respondents from Chunya was having a PhD.The researcher ivestigated further to examine the involvement why PhD holders are not there in the Gold field it was observed that people with high level of education are less involved in gold fields exept working in the offices commented by one of the respondent in the field.In Chunya the secondary school levels and primary school are the key player in the gold field. People wit their degrees are few in numbers as shown in the figure above.

Figure 8.3 Level of Education for Arusha Urban Respondents



The above table shows that among the main repondents and their level of education who provided their response from Arusha Urban was people with bachelor degree/Advanced Diloma 50(32%) of respondents was the highest then followed by secondary school levels who represented 45(29%) of respondents in Arusha urban.There were also 2 respondents with PhD representing 1% of respondents and 11(7%) with their masters education level.Primary school level accounted only 35 (22%) respondents

8.3.3 The Value of Gold

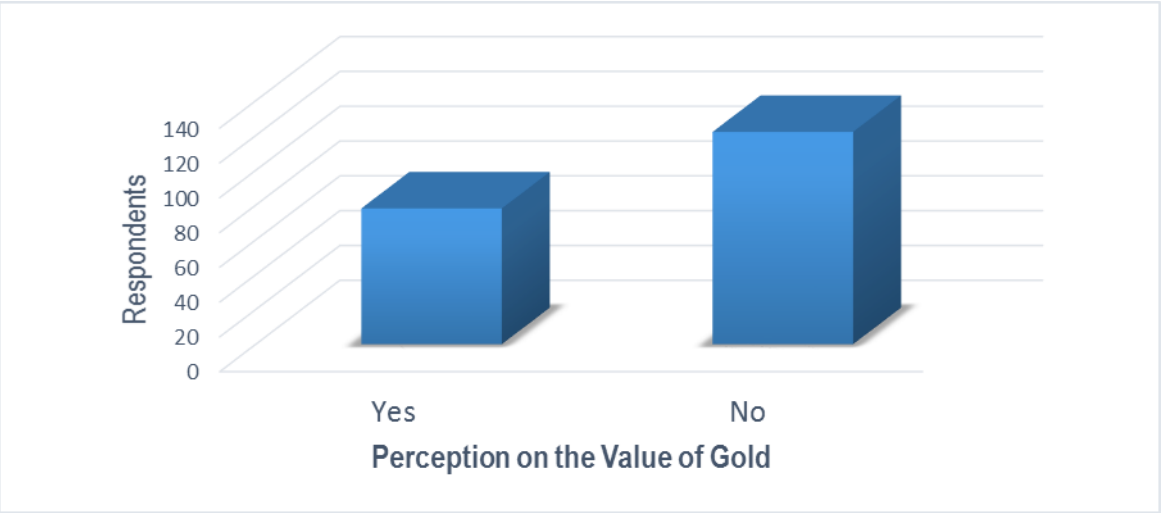
In examining whether the value of Gold is known among Graduates, Staffs, Academicians, Students, business community, Small Scale Gold Producers, Gold Brokers and individuals. In testing whether the value of Gold is known or not the following table reveals the information

Table 8.4 Perceptions on the Value of Gold

	Arusha Urban	Mbeya - Chunya	Total	Percentage
Yes	59	78	137	0.3837535
No	98	122	220	0.6162465
Total	157	200	357	100

The above table demonstrate that the value of gold for both regions, Arusha and Mbeya for among Graduates, Staffs, Academicians, Students, business community, Small Scale Gold Producers, Gold Brokers and individuals is generally not known. It indicates that 38.4% said yes they know the value and 62 % said that they do not know the value.

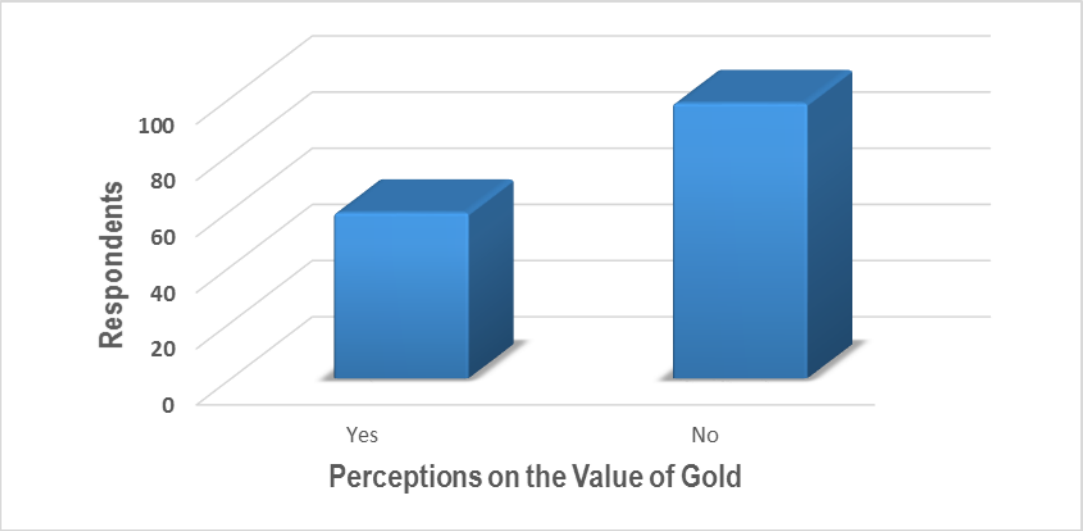
Figure 8:4 Perception on the Value of Gold in Mbeya



Mbeya in Chunya had 200 total respondents remarkably 78(39%) said that YES they know the value of gold while 122(61%) respondents NO.

For Arusha people on the perception regarding the value of gold can also be shown in the following figure;

Figure 8.5 Perception on the Value of Gold in Arusha



Arusha urban had 157 total respondents remarkably 59(37.5%) said that YES they know the value of gold while 98(62.4%) respondents said that they NO to value of gold.

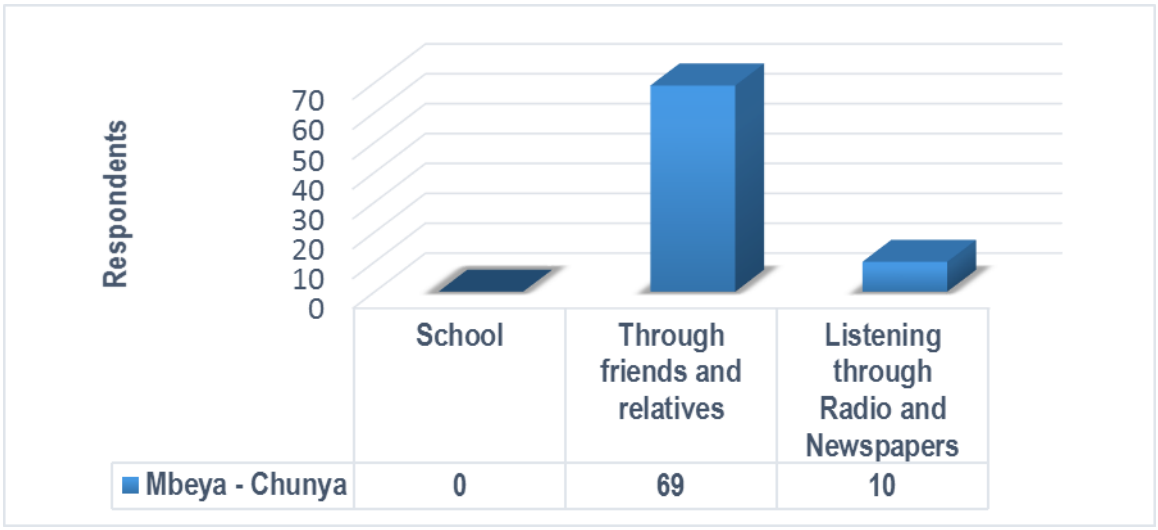
The data suggest that the value of Gold resource is not known among individual and we reject the hypothesis that the value of Gold is known among public and individuals in Tanzania.

The researcher probed further on those who said they know the value of Gold on how did they learn about the value of Gold and the following was the results;

Table 8.5 How Did You Know the Value of Gold?

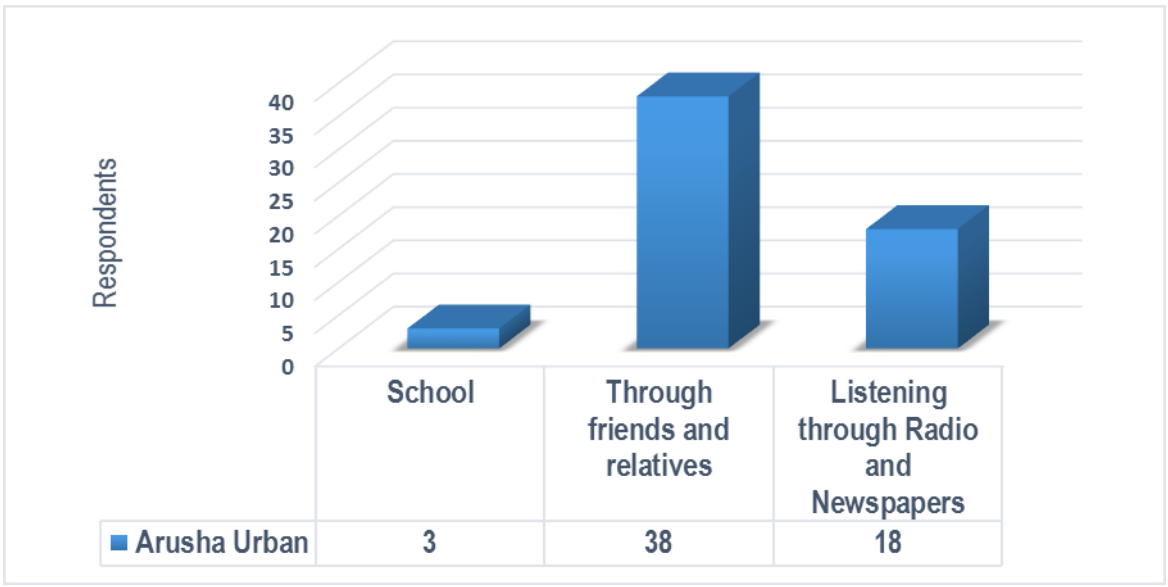
Public Category	Arusha Urban	Mbeya - Chunya
School	3	Nil
Through friends and relatives	38	69
Listening through Radio and Newspapers	18	10
Total	59	78

Figure 8.6 How they Knew the Value of Gold-Mbeya Chunya



For Mbeya in Chunya it was observed that 69(88.4%) respondents said they knew gold value through friends,10(12.8%) respondents said they knew gold value through listening radio and newspapers only none of respondents knew gold value through school.

Figure 8.7 How they Knew the Value of Gold-Arusha Urban



For Arusha urban it was observed that 38(64.4%) respondents said they knew gold value through friends,18(30.5%) respondents said they knew gold value through listening radio and newspapers only 3 (5%) respondents said they knew through learning in school.

When you look at both regions you will find that those individual who claimed that they know the value Gold they only learn through their friends and relatives otherwise they fall into gold ignorance trap zone.

The researcher observed that the value of Gold is not known because is not taught in the schools. Graduates with their education levels they could have known the value and help to rescue the economy and this is the paradox where the multinational benefit the most. The multinational companies exploiting and exporting gold in Africa they know the value and they don't waste time in its exploitation. They exploit Gold at the high speed at the rate of doubt and benefits of gold value ignorance among local people as export data reveals. The multinationals they are participating in the zero sum game where they benefit more than the local people. Gold can be used as money but this is not the case among Graduates, Staffs, Academicians, Students, business community, Small Scale Gold Producers, Gold Brokers and individuals in Tanzania.

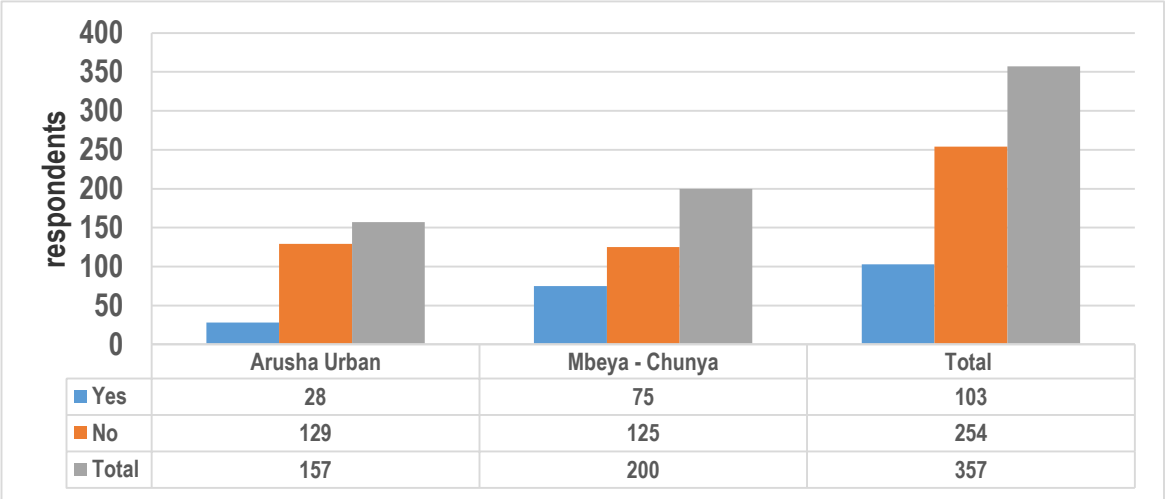
Very few individual knows the value of Gold in Tanzania. Even at the level of professors or PhD holders they only talk about gold resource or hear about gold resource through radio or news paper in real sense they are ignorant to gold value. Some of them interviewed they could not be able to differentiate between gold and silver. Researcher of this paper identified the major factor is that Gold resources and other natural resources are not taught in schools especially from primary school to secondary schools and the government should put more emphasis on gold and other resources otherwise the zero sum game of multinational companies in Tanzania and Africa will prevail.

Table 8.6 Differences between Gold and Silver

Category	Arusha Urban	Mbeya - Chunya	Total	Percentage
Yes	28	75	103	0.288515406
No	129	125	254	0.711484594
Total	157	200	357	100

The researcher asked whether the respondent can differentiate between gold and silver and realized that this was the most difficult question as many graduates, academicians, business community and individuals could not make a difference. It is evidenced from the above table that 71% of respondent said (no), meaning that they cannot differentiate between gold and silver but only 29% said they can make a difference. Among the reasons identified by the researcher is that there is less awareness among educated people since is not included in their school curriculum.

Figure 8.8 Differences between Gold and Silver



	Arusha Urban	Mbeya - Chunya	Total
Yes	28	75	103
No	129	125	254
Total	157	200	357

It is observed that many individuals cannot differentiate between gold and silver despite a huge stock of gold resources in the country. Citizens can be easily cheated if the cannot differentiate between the gold and silver. The aim is to examine whether they can put value on gold stock production and export. Very possible that the gold export can sometimes be undervalued during the export

The researcher observes further that with lower understanding on gold value among graduates, academicians, business community and individuals in the country facilitate poor policy formulation on gold export with less benefits to the domestic economy. The only way towards better policy formulation the local people must have gold knowledge that will enable them to negotiate with other multinational companies equally.

8.3.4 Involvement of Multinational Companies

Under this analysis the researcher was guided by the following hypothesis:

H_0: There is less involvement of multinational in Gold production and exploitation in Tanzania.

H_1:There is too much involvement of multinational in Gold production and exploitation in Tanzania.

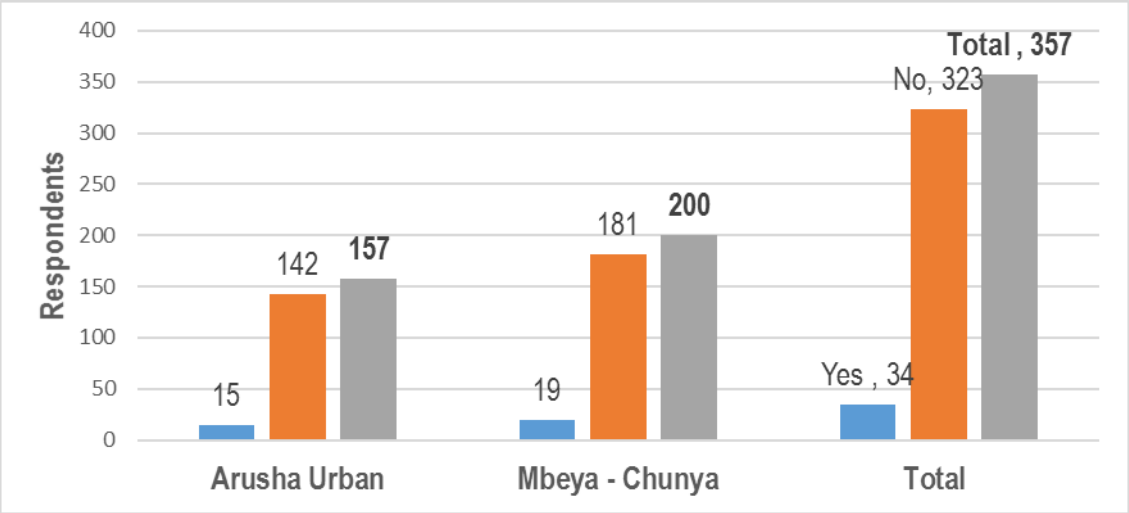
Table 8.7 Multinational Companies Involvement in Gold Production

Category	Arusha Urban	Mbeya - Chunya	Total	Percentage
Yes	15	19	34	0.095238095
No	142	181	323	0.904761905
Total	157	200	357	100

Respondents were asked whether there is less involvement of multinational companies in

gold production and exploitation in Tanzania. It is observed from the above table and the figure below that only 34(10%) respondents acknowledged that YES there is less involvement of multinational companies in Gold production and exploitation. But 323(90%) respondents from the two regions of Arusha urban and Mbeya(Chunya district) provided their feedback that there is much involvement of multinational companies involved in Gold production and exploitation.

Figure 8.9 Multinational Companies Involvement in Gold Production



Therefore the researcher rejects the hypothesis that there is less involvement of multinational in Gold exploitation in Tanzania and accepts the alternative hypothesis that there is too much involvement of multinational in Gold exploitation.

It was identified by the researcher that among the main reasons to this exploitation is that the multinational companies they knows the market and Gold value also poor mining policies towards multinational involvement in Gold production and exploitation is another contributing factor to Tanzania and Africa as a whole with lower gold export revenue to support domestic economy .

It was also observed by the researcher from Chunya(Gold production fields) at a time when researcher wanted to get inside one of the multinational company in the area, he was not allowed to enter into production zone that the area was restrictive for any reason unless special permission from high authority. There are several gates you may encounter until you enter production zone but generally very restrictive.

Gold production and exploitation in Tanzania is also reflected in the secondary sources data for comparable reasons observed by the researcher that many multinational companies are well equipped in the zero sum game for gold

production and export and make sure that they exploit to the maximum than the local economy. Resources are extracted and wealth is transferred from Tanzania to develop their foreign nations to a larger extent and this is the great challenge and root of social, economic, poverty and political unrest in Tanzania, Congo, Sudan, Nigeria, Libya etc.

Secondary data also reveals that the level of export of each giant firms (the multinationals) involved in exploitation of gold resources in Tanzania has increased.

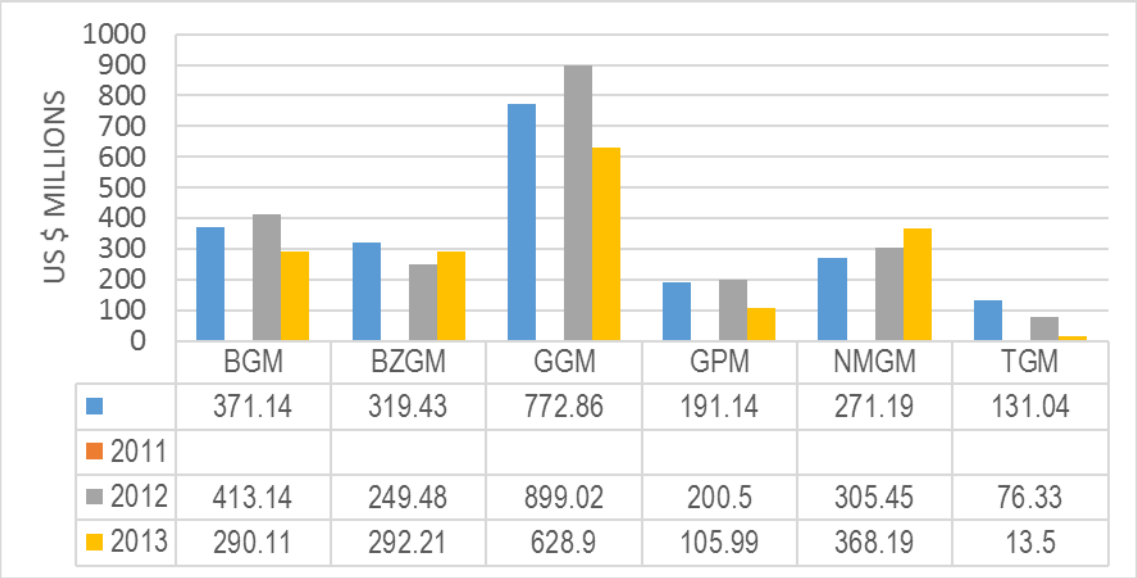
Table 8.8 Giant Firm Gold Export from Tanzania

	TABLE : EXPORT VALUE IN USD $ MIL.					
YEARS	BGM	BZGM	GGM	GPM	NMGM	TGM
2011	371.14	319.43	772.86	191.14	271.19	131.04
2012	413.14	249.48	899.02	200.5	305.45	76.33
2013	290.11	292.21	628.9	105.99	368.19	13.5

Source:TMAA(2016)

The above table provide analysis of gold export value in USD million BGM export value was initially 371.14 million in 2011 and they only paid to the government 13.26 million as Royalty representing almost 4% paid to the government as revenue. BZGM export value was 319.43 in 2011 while royalty to the government was 10.28 million representing almost 3% of total export.

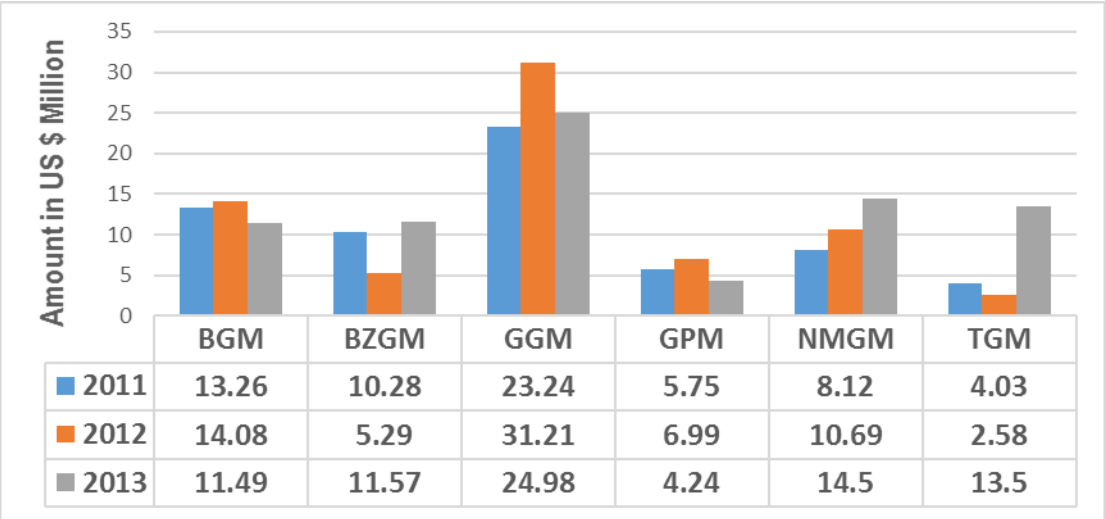
Figure 8.10 Giant Firm Gold Export from Tanzania 2011-2013



The trend is observed that for all six companies involved in gold production and exploitation in Tanzania are less supportive in the domestic economy but only extracting Gold resources to benefit the off shore economy in the form of capital flight.

Table 8.9 Total Royalty Paid to Government US $ Mil.						
YEARS	BGM	BZGM	GGM	GPM	NMGM	TGM
2011	13.26	10.28	23.24	5.75	8.12	4.03
2012	14.08	5.29	31.21	6.99	10.69	2.58
2013	11.49	11.57	24.98	4.24	14.5	13.5

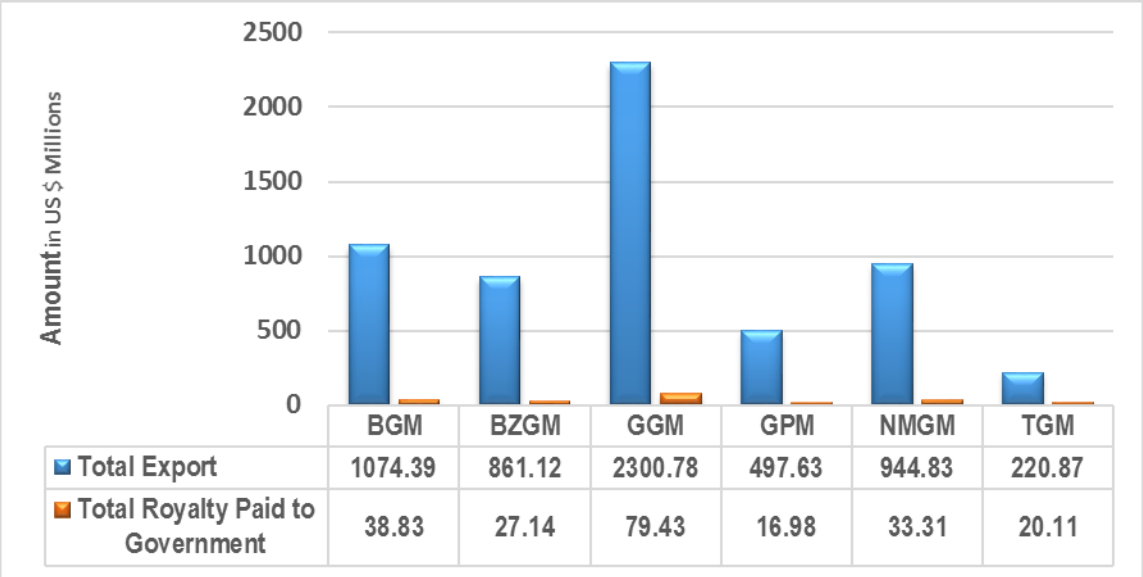
Figure 8.11 Royalty Paid To the Government by Multinational Companies 2011-2013



The figure above demonstrate the royalty paid by the multinational companies for three years only to the government for GGM the amount of gold export was only US $ 772.86 Million in the year 2011 but they only paid US $ 23.24 million in 2011 as royalty to the government. In 2012 GGM paid US $ 31.21 million as royalty to the government while total export was valued at US $ 899.02 million. Also in 2013 GGM paid 24.98 Million only to the government while export was US $ 628.9 Million. It is general condition that government receives on 3% and 97% is taken out of the country. The amount left for the domestic economy is not significant to support national development including agriculture. The following

figure demonstrate the trend of three years of gold export only from 2011 to 2013 only by the key multinational gold companies who dominate the total gold export.

Figure 8.12 Total Gold export and Royalty Paid by Companies from the Period 2011 -2013



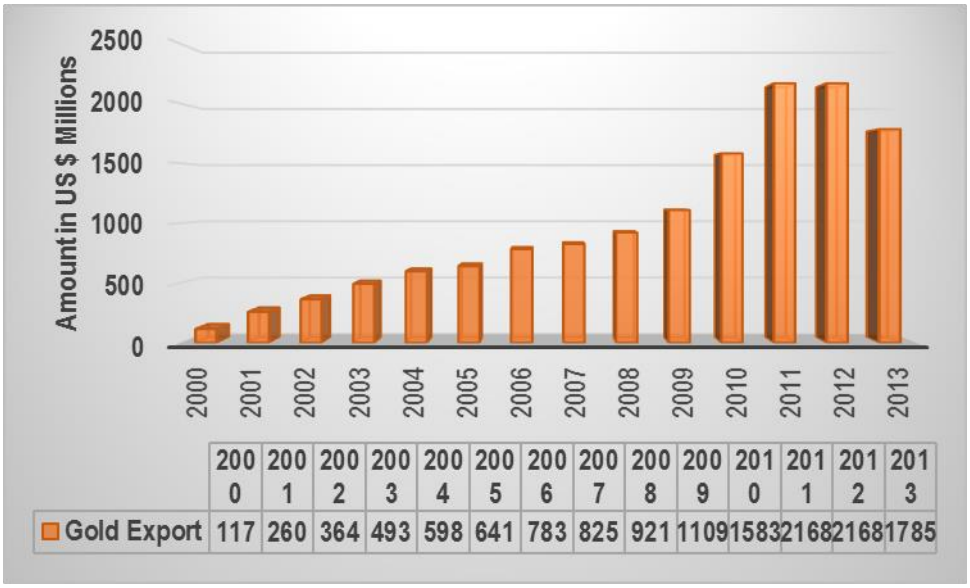
	BGM	BZGM	GGM	GPM	NMGM	TGM
Total Export	1074.39	861.12	2300.78	497.63	944.83	220.87
Total Royalty Paid to Government	38.83	27.14	79.43	16.98	33.31	20.11

The above figure portrays how government receives royalty from gold export companies including GGM, BGM,BZM, GPM, TGM and NMG for the period 2011 to 2013 only. It is observed that the government receives only 3% and 97% is left to multinational companies. The 3% is what government is left with for goods and services in the country. There is no VAT for gold export. This is indicative that Tanzania is in the Gold export value ignorance trap zone.

The presence of Gold companies especially in Tanzania have to increase responsibilities and play fair game with the goverment immediately to secure our domestic economy before Gold resources is depleted. Gold as a natural resource capital can assist in alleviating poverty and improving the economy once the trend of exploitation is reversed and the value of Gold is known among government officers and citizens hence avoiding the zero sum game played by the multinational companies.

The researcher of this paper observed that there is also a continuous increase of Gold export from Tanzania despite the world economic crisis . The following trend of gold export from Tanzania is shown here under;

Figure 8.13 Gold Export US $ Millions from the Period 2000-2013



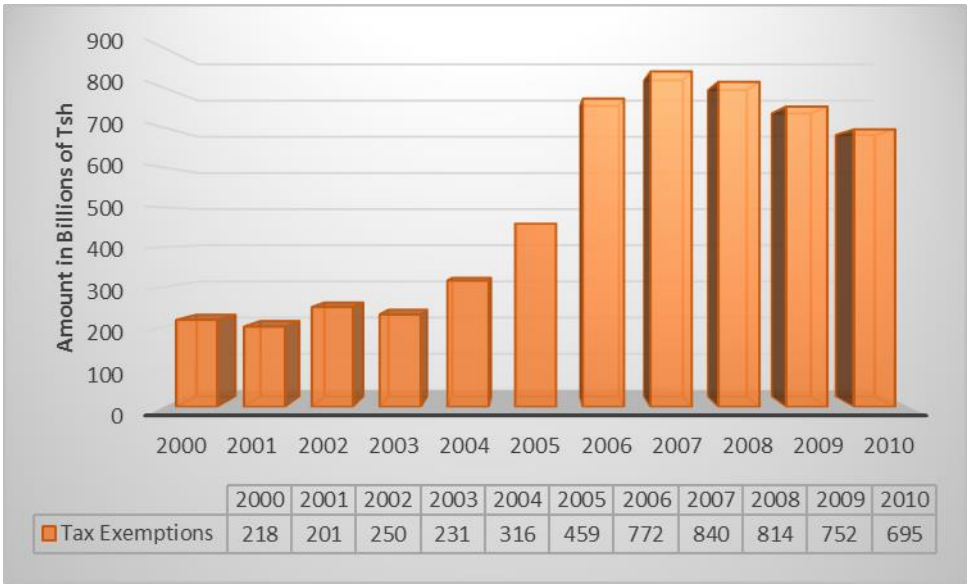
Source: TMAA(2015)

Gold export in Tanzania has mainly been dominated by larger foreign firms that contribute to our export given the shrinking value of our primary products Gold export is performing wonders in Tanzania. Taking the period of this study from the year 2000 to 2013 gold export has been increasing throughout the period.

In the year 2000 Gold export was USD $ 117,000,000 for gold alone from the giant gold producers in Tanzania. Surprisingly Gold export has been increasing continuously and reached its maximum in 2011 that recorded the highest Gold export of USD $ 2,068,000,000. Similar record was also observed in 2012. By 2013 Gold export slightly fell to USD $ 1,785,000,000 but not significant fall. The total Gold export counted USD $ 13,815,000,000 for the total export during the year 2000-2013.

The increase of gold export is also accompanied with the increase in tax exemptions as the following figure reveals;

Figure 8.14 Tax Exemptions to Gold Exporters Multinationals



Data Source: Uwazi (2010)

The above figure demonstrate that total tax exemptions has been increasing from the year 2000 with its lowest of 201 billion in 2001 and reached its maximum level of 840 billion and slightly decreased to 695 billion in 2010.Among the main beneficiaries of tax exemptions has been identified to be the giant mining companies the multinationals companies. It reveals that the amount of tax exemptions given to these firms is the lost economic opportunity that could have been used to improve domestic economy mainly through promoting the agriculture sector. The total lost economic opportunity during the reported period above amounted to 5,548 Billion for all those ten years. This amount alone could have supported the agriculture sector in the country.

Therefore multinational companies gets

- Tax exemptions by the government
- Only pay 3% of royalty
- Take away 97%
- Do not pay VAT
- Protected by the government
- Not locally publicly owned
- Enjoy Gold ignorance zone
- They export in the form of raw gold and bars

8.3.5 Significance of Gold in Poverty Alleviation

Respondent were requested to fill the table below by rating the significance of gold exploitation for poverty alleviation and the economy as the whole. The researcher was guided by the following hypothesis

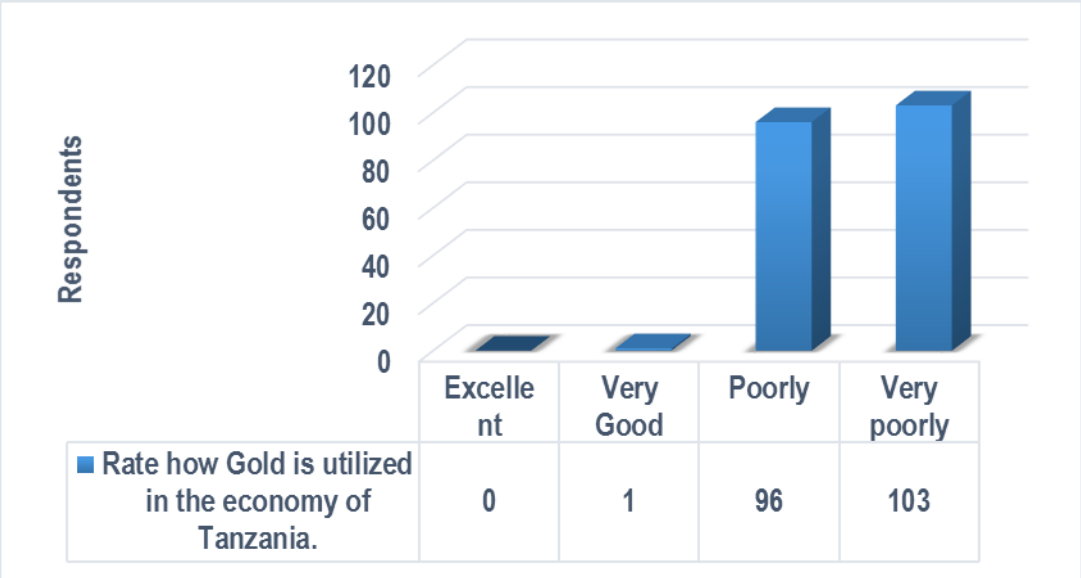
Table 8.10 Rating the usefulness of gold to in poverty alleviation and the economy as whole (Mbeya –Chunya District)

		Excellent	Very Good	Poorly	Very poorly
i)	Rate how Gold is utilized in the economy of Tanzania.	-	1	96	103
ii)	Rate how gold benefit local people		49	151	-
iii)	Rate how multinational benefit from gold exploitation	199	1	-	-
iv)	Rate how Gold help reduce poverty in Tanzania	-	-	47	153
v)	Rate the significance of Gold in poverty alleviation	178	22		
vii)	Rate the usefulness of Tax officials in assessing the value of Gold	-	1	87	112

Source: Research Data Survey (2016)

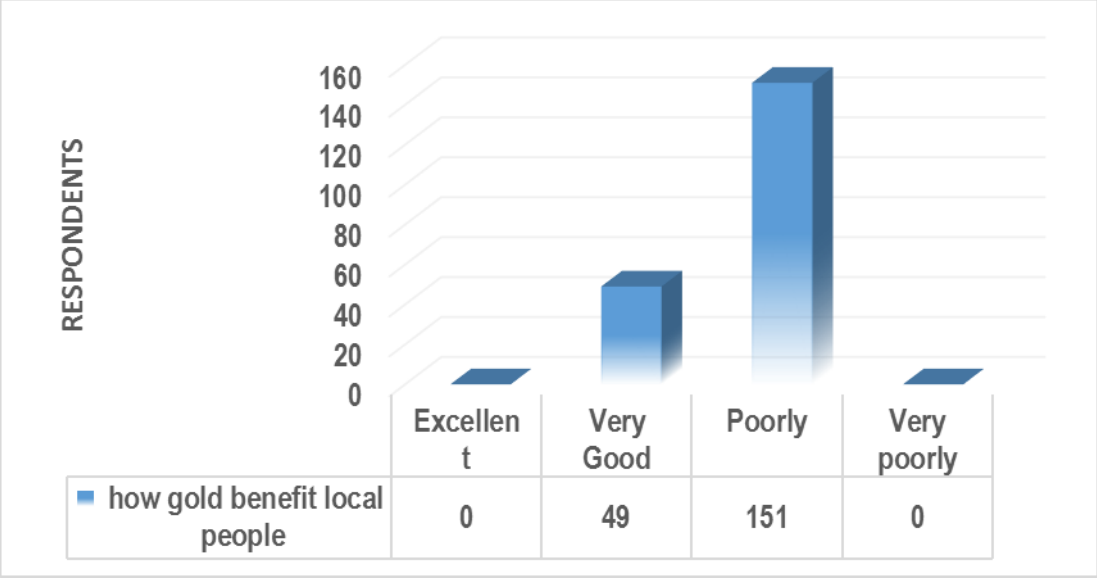
The table above indicate respondent rating the usefulness of gold in poverty alleviation and the economy as whole for (Mbeya – Chunya District).It reveals that Gold is very poorly utilized in the economy. This can be linked to lack of knowledge to know the value of gold.

Figure 8.15 How Gold is utilized in the economy of Tanzania-Chunya Respondents



103(51.5%) respondents said that Gold export is very poorly utilized in the economy and 96(48%) respondents said that gold is poorly utilized while 1 respondent said that gold is very good utilized in the economy. General picture we are getting is that gold is very poorly utilized in the economy as reported from many responded from chunya.

Figure 8.16 How Gold Benefit Local People - Chunya Respondents

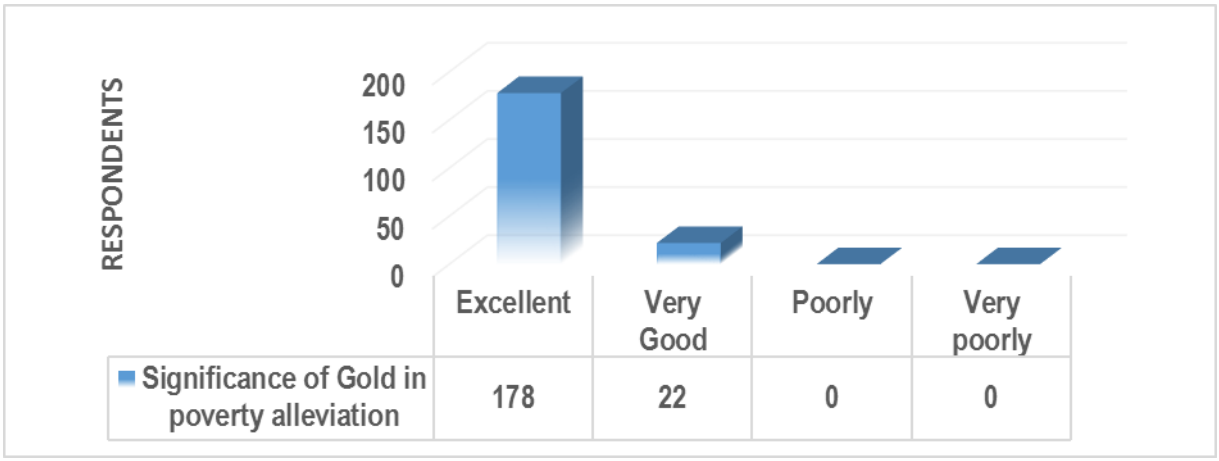


151(76%) respondents from Chunya rated that they are poorly benefiting from gold production while 49(24%) respondents rated very good and useful in alleviating poverty and therefore usefulness of gold to in poverty alleviation and the economy is poorly since it do not benefit the local people

8.17 How Multinational Benefit from Gold Production and Exploitation-Chunya Respondents

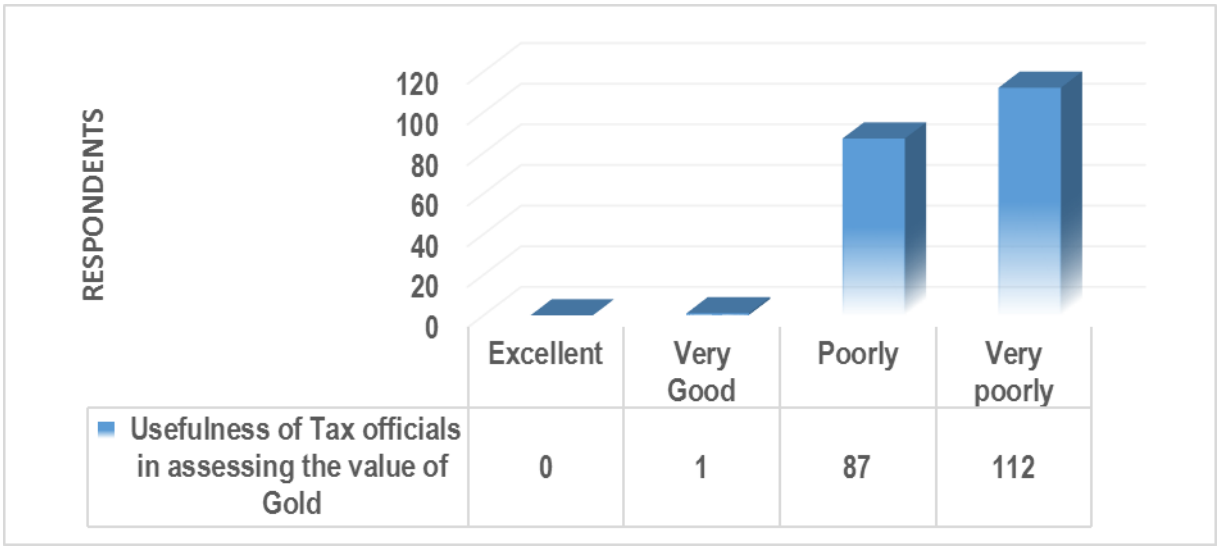
It was also revealed from 199 respondents who revealed that the multinational are in excellent in benefiting from gold production and exploitation than the local economy. This can be linked with lower skills on understanding the value of gold to play in the local economy and therefore multinationals enjoying maximum benefits of gold production and export.

Figure 8:18 Significance of Gold Export in Poverty Alleviation-Chunya respondents



Many respondents appreciated the significant of gold in poverty alleviation if well controlled by the government. 178(89%) of respondent in Mbeya chunya district responded that significance of gold in poverty alleviation is excellent and 11% rated very good in alleviating poverty. This will depend when the gold value is known among individuals and the government hence reducing the zero sum game played by multinationals companies in Tanzania who take out 97% and leave 3% only to the local economy.

Figure 8:19 Usefulness of Tax Officials in Assessing the Value of Gold



It was observed from respondents that tax officials were not useful in assessing the value of gold produced in the area as 112(56%) rated very poor for tax officials in assessing the value of gold and 87(43.5%) respondents ranked poorly only one respondent rated that it is very good.

Table 8 .11 Rating the usefulness of gold to in poverty alleviation and the economy as whole (Arusha Urban)

		Excellent	Very Good	Poorly	Very poorly
i)	Rate how Gold is utilized in the economy of Tanzania.	-	14	108	35
ii)	Rate how gold benefit local people	-	1	49	107
iii)	Rate how multinational benefit from gold exploitation	139	17	1	-
iv)	Rate how Gold help reduce poverty in Tanzania	-	2	60	91
v)	Rate the significance of Gold in poverty alleviation	119	21	17	-
vii)	Rate the usefulness of Tax officials in assessing the value of Gold	-	7	100	50

Again the table above indicate respondents rating the usefulness of gold in poverty alleviation and the economy as whole for Arusha Urban. The table also reveals that Gold is very poorly utilized in the economy.108 respondents said that

it is poorly utilized 35 respondent said is very poor utilization in the economy. It was also revealed from respondent that the multinational are in excellent in benefiting from gold exploitation than the local economy and 139 rated excellent for multinational benefiting. Many respondents appreciated the significant of gold in poverty alleviation.119 of respondents in Arusha urban responded that significance of gold in poverty alleviation is excellent but they demanded more good policies.

The usefulness of tax officials in assessing the value of gold 100 respondents said it is very poor. This is also linked to lack of knowledge to capture the value of gold domestically and internationally.

Figure 8.20 Usefulness of gold to in poverty alleviation and the economy as whole -Arusha Urban

	Rate how Gold is utilized in the economy of Tanzania.	Rate how gold benefit local people	Rate how multinational benefit from gold exploitation	Rate how Gold help reduce poverty in Tanzania	Rate the significance of Gold in poverty alleviation	Rate the usefulness of Tax officials in assessing the value of Gold
Very Good	14	1	17	2	21	7
Poorly	108	49	1	60	17	100
Very poorly	35	107	0	91	0	50

Therefore based on the above observations for two regions on the null hypothesis that gold is not significant in poverty alleviation, is rejected by the researcher and accept the alternative hypothesis that gold is significant in poverty alleviation. Proper policies should be formulated for this purpose to ensure that more of gold export is left to local economy.

It was also observed from the staffs from the ministry of minerals for northern zone that there some gold companies in the country with private airline where there is no control by the government on those airstrip's. They come with private airline they collect the quantity of gold with no proper control from the government on the quantity and pricing. This indicate that a lot of gold production and export is stolen by the multinational exploiting gold in Tanzania.

8.3.6 Gold Market in Tanzania and Nature of The Market

Unlike other countries of the world Tanzania has no organized market for locally produced gold. Researcher moved around, Mbeya, Arusha and Dar es salaam and observed that the market is still not organized like in India, Dubai, London and other countries where for country like India they have the formal market for commodity exchange for gold in India. Tanzania Locally produced gold is only for export by giant multinational who export in the form of raw gold and bars for processing abroad. Key local gold buyers are people with local jewelry shops and other individual buyers from different countries who come and buy locally produced gold for export. Local people buys from the gold field in Chunya or other places and sell to local jewelry shops and other individual buyers. The business is organized by the groups of gangs-brokers who link the buyers and seller in very informal way and sometimes can be of high risk. Many Gold brokers they are not reliable people they tend to cheat dealings with local sellers but they have power of information regarding price of gold in the area. Until the government formalize the business in proper form then brokers will gain more understanding regarding the brokerage business in Tanzania

Nature of gold market in Tanzania is very restrictive by nature and dominated by high security and the sign that will tell you that here is a jewelry shop you will see a security guard sitting with a gun and guarding a Jewelry shop. The jewelry shops are of very small retail shop outlets licensed by the government of Tanzania. Generally there very little organized market and more research need to be conducted on how gold market can be modernized in the country. They insisted that gold is abundant in Tanzania but we lack proper policies regarding the value among citizens and policy makers.

8.3.7 Gold Price in Tanzania

At the time when the researcher was moving around the price of gold was ranging from 65,000/= to 75,000 per gram this was Mbulu gold field (December 2016 price). The price in Chunya it ranged from 55,000/= minimum to 65,000 maximum with average price of 60,000/=(February 2017 price).In Dar es Salaam the gold market was uncertain but depending on the buyers quantity demanded minimum price was 80,000/= and the maximum price was 90,000/=(December 2016 price).Many people were observed not caring whether the price of gold is high or low this time. They are not trained to understand that even gold can be used for hedging against the future.

8.3.8 Mining Policy Observations and Critique

8:11:1 Tanzania Mining Act 2010

The mining act 2010 provides avenues for mining exploitation in Tanzania. The act control all mineral operation and export in Tanzania while giving powers for individuals the right to exploit and export mineral resource. In this act there are medium scale mining Scale licence, special mining licence, dealers licence and brokerage licence.

"Medium scale mining operation is the licence for the operation in mining whose capital ranges between US $ 100,000 to US $ 100,000,000. For special ming licence means licence for large scale mining operation whose capital investment is not less than US $ 100,000,000 " Tanzania Mining Act (2010)

Generally mineral right is given to companies and individuals interested in mining . It is pointed out in the Tanzania Mining Act (2010) under "part II of the general principle section 8(3) that mining licence for mining gemstones shall be given to applicants who are Tanzanians only. But section 8(4) gives powers the minister to allow non citizens to engage into mining together with local people."

Critique

- The mining act 2010 gives the minister too much power to manipulate some policies based on the personal judgment that includes the multinational company's involvement in mining exploitation and export.

- The minister's power is also questionable and therefore some limits to exercise his power is needed to help control mining sector in Tanzania.
- Capital requirement for medium scale and special mining license is not reasonable and affordable for local people in Tanzania.

8.11.2 Dealership and Brokerage in Gold

"The holder of dealership license gives power the owner of the license to buy and sell mineral as specified in the license. The holder also is given power to export the mineral outside the country. But the owner must keep all records of books of accounts and submit the report to zonal mines officers on quarterly basis. The holder of the brokerage license is authorized to buy or acquire gold or any other gemstones but not to export any mineral" Tanzania Mining Act (2010)

Critique

- The holder of the brokerage license are the majority of individual citizens involved in mining therefore the act do not empower citizens to export worldwide and lose the opportunity to maximize the local benefits and the domestic economy.

8.3.9 ROYALTIES, FEES AND OTHER CHARGES

It is observed from the act that every authorized miner shall pay to the government a royalty on the gross value of mineral produced:

Table 8.12 Gross Values of Mineral Charges

Type of Minerals	Rate
Uranium	5%
Gemstone and Diamond	5%
Metallic Minerals such as Copper, Silver and Gold	4%
Value Added Tax	NIL
Export Tax	Nil

Tanzania Mining Act (2010)

Critique

- The act is still too general and it do not provide a clear picture about the gross values as a bases for charges.
- It provides chances for the miners to manipulate prices with the aim of profit maximization
- It provides room for negotiating with the miners regarding the gross value and therefore encourages corruption.
- The gross value should at least be the world gold market price.
- It is too low
- No value added tax(VAT)
- No Export taxes
- Raw gold is exported abroad for processing offshore.

8.3.10 Mining Policy 2009

The mineral policy 2009 acknowledge that mineral sector can stimulate development in the other sector of the economy and enhance the economic benefits. The policy state about the value addition in mining sector to some extent but very limited in broad sense. Generally the following are the key weakness observed in the mining policy of 2009.

8.3.11 Mining Policy 2009 Weakness

- The policy provides weak integration between mineral sector and other sector of the economy.
- Much linkages is on the provision of goods and services to miners without considering the strategic issues of value addition industries.
- The policy state do not reveal on how the government will do as an investor in the value addition of various minerals.
- The policy is not known to the public at large to allow them enjoy mineral opportunities in Tanzania and the economy at large.
- Mineral sector is still restrictive especially to brokers with less capital to export minerals.

- The policy favors larger companies and the multinationals who exploit and export at the high speed of the completion rate with lower level of taxes- no value added tax on gold
- No export taxes is proposed in the policy
- Multinational uses the mining sector policies and benefit from capital flight.
- Multinational companies benefit 96% of the benefits
- Multinationals companies benefit more than the local companies.
- Most of the multinational companies are listed in London stock market or New York Stock market and therefore the gold returns is shared among the shareholders in off shore countries.

8.4 Conclusion and Recommendations

8.4.1 Conclusion

Quantitative data reveals the significance of Gold export in the economy. It is suggested that there is a positive relationship between Gold Export and Gross Domestic Product in Tanzania as evidenced in the regression and the correlation output. The significance of Gold is much known to multinationals that enjoy lower taxes and capital flight to repair their economies rather than the domestic economy. The multinationals enjoy the Gold resource ignorance among elite who have less capability to evaluate gold export and ensure it benefit the local. The paradox of not knowing the value of Gold is the zero sum game that favor multinational companies in exploiting Gold in Africa. The multinational companies exploiting gold knows the value and the market and uses of Gold while the local cannot. The gold value ignorance in Tanzania public includes some PhD holders, master's degree holders,1st degree and others. Those few individuals who claim that they know the value of gold they evidenced that they only learn about gold value through their friends and relatives otherwise they fall into gold ignorance trap and this is the paradox.

The researcher observed that the value of Gold is not known because is not taught in the schools or training vacation and universities. Graduates with their education levels they could have known the value and help to maximize Gold

export revenue domestically. The multinational companies exploiting gold in Africa they know the value and the market strategies while the local cannot and they don't waste time in exploitation. They exploit Gold at the high speed at the rate of doubt and benefits of gold value before the level of awareness on gold value is exposed. It is also observed that the usefulness of tax officials in assessing the value of gold it is very poor. This is also linked to lack of knowledge to capture the value of gold domestically and internationally that is why the multinational benefit from tax exemptions and lower level of taxes. This is only for gold but it is possible for other natural resources like gas uranium, land , diamond, etc might be the same and this is the paradox.

8.4.2 Recommendation

Since gold is depletable resources and significant now for economic growth the government must therefore do the following;

Short term strategies

- Introduce special curricular in primary schools, secondary schools, universities and other vocational trainings on gold exploitation process, gold value, quality and market for gold.
- Review tax and other exemptions to multinationals engaged in gold exploitation and export.
- Adopt 90% of gold export value must be spent locally to promote domestic economy and reduce capital flight among the multinationals companies.
- Government must empower local people with special funding to enable local people to exploit gold
- Tax officials must be empowered with education to detect gold export values and ensure local people benefit more than the multinational companies.
- Giant firms and governments in the world involved in the exploitation of Gold in Tanzania and Africa must increase responsibility, accountability and transparency on tax deals, incentives must be avoided and their capital flight must be controlled so that more money gained from sales of Gold export and other natural resources to a large extent must be

ploughed back to domestic economy before its depletion point and bring about development in the country.

- Stimulate local gold demand through establishing Tanzania Gold Market Exchange where people can be freely to trade locally produced gold that can also provide an opportunities for future gold trading in Tanzania.

Long term strategies

- Establish value added industries for gold processing in Tanzania must be established
- Reform curriculum to all schools and institutions to reflect local natural resources values, uses and benefits.
- Support local with heavy equipment machines and technology for gold exploitation
- Review gold mining policies and contracts with multinational companies involved in gold exploitation and reduce the zero sum game expectations with win - win approach on gold dealings in Tanzania.

CHAPTER EIGHT

AGRICULTURAL DEVELOPMENT AND POVERTY ALLEVIATION A SURVEY REPORT

The researcher has explored in this chapter the current level of maize farm output per acre of production, whether farm investment is technically feasible, viable and profitable investment and therefore there is no need for gold to account for agriculture growth. He tried to investigate the significance of agriculture in poverty alleviation and some constraints hindering the growth of the agriculture sector and strategy for growth. On the basis of findings he suggested some policy that will be useful to policy makers regarding Gold resources and stock for export for agricultural development and poverty alleviation.

9.1 Data Analysis and Results

The data were processed by using excel and common office application mainly Ms-Word. Statistical presentation such as NPV computations, tables, charts, percentages and ratios have been used in the analysis and presentation of the data by using excel spreadsheet.

In this analysis, there were a total of 450 respondents who were contacted out of which a total of 300 provided their feedback through questionnaire, interview, discussions. This shows a response rate of 67% which is significant to validate the study. Findings from interview and questionnaire were also supplemented by observations. The table below summarizes responses Individual farmers and members of agricultural association from Arusha- Karatu District (Mbulumbulu ward the village of Kambi ya Simba) Manyara -Mbulu District in the village of Bargish antsi and Moringa –Daudi ward.

Table 9.1 Respondents Distribution and Categories

				Respondents		
S/no	Region/District	Village/Ward	Distribution	Expected	Actual	%
1	Arusha- Karatu District	Mbulumbulu /Kambi ya Simba	Individual Farmers and members of agricultural association	150	150	100
2	Manyara - Mbulu District	Bargish antsi	Individual Farmers and members of agricultural association	150	69	46
3	Manyara - Mbulu District	Moringa - Daudi	Individual Farmers and members of agricultural association	150	81	54
Total				450	300	67

9.2 Gender Distribution

Table 9.2 Gender Distributions

				Actual Respondents		
S/no	Region/District	Village/Ward	Distribution	M	F	Total
1	Arusha- Karatu District	Mbulumbulu /Kambi ya Simba	Individual Farmers and members of agricultural association	39	111	150
2	Manyara - Mbulu District	Bargish antsi	Individual Farmers and members of agricultural association	30	39	69
3	Manyara - Mbulu District	Moringa - Daudi	Individual Farmers and members of agricultural association	29	52	81
Total				98	202	300

The above table demonstrates the gender distribution for Arusha- Karatu District (Mbulumbulu ward the village of Kambi ya Simba), Manyara - Mbulu District in the village of Bargish antsi and Moringa –Daudi ward who were served with

questionnaires and interview regarding The role of Gold export in agricultural development for poverty alleviation.

For Karatu District in Manyara region there were 39 males in Mbulumbulu representing 26% of all males and 111 females representing 74% who responded to questionnaires and interview. Manyara -Mbulu District in Bargish-antsi there were 30 males representing 43.5% and 39 females representing 56.5%. who responded to questionnaires and interview, While in Moringa – Daudi there were 29 males representing 35.8% of all males and 52 females representing 64.2% who responded to questionnaires and interview in that ward.

During the research period september 2015 to march 2016 most of the respondent were found in their firm field and in their homes.It was also observed that there is a large parcentage of women who were found working in the maize field farms as the above statistics dominates to all villages and wards.

9.3 Farmers General Conditions

It was obseved by the researcher poor living condition among majority of farmers in all the sites visited. See the attached photoghraphs in the appendices farmers living condition in Moringa Daudi – Mbulu district in Manyara region.It display farmers houses and livind standard given the gold export in the country.Farmers surrounded with constructed thatched houses with mud wall is found to be common picture among farmers. It demonstrate that gold export has a role to play to account for agricultural growth in Tanzania since 80% of the work force in Tanzania are engaged in agriculture.

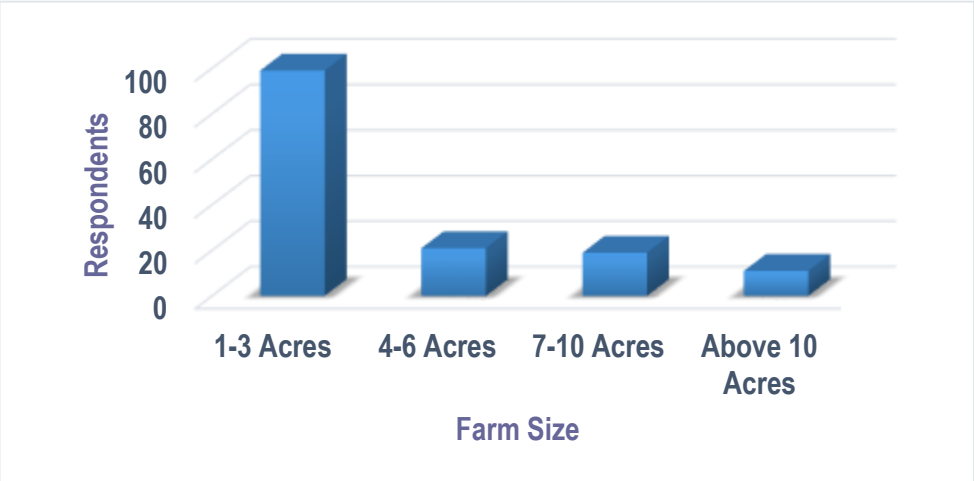
Researcher visited individual farmers in their farms and observed their general livind condition and maize output. Current living condition of farmers in all villages visited is not good compared to the level of gold deposits and export by the government. Maize farmers also wants good houses and income enough to suport their families.They also need good infrastructure to transport their harvest from farm to the market.Farmers require a quality seeds that can ensure them with high maize yield.They also require modern farming technology and

therefore the government has a role to play since agricultre is the major livelihood among people in Tanzania.

9.4 Farm size owned by farmers in the area

Researcher also observed that all respondent in all villages were having maize firms and the size of the firms varies with size as revealed here below;

Figure 9.1 Farm Size Owned By Farmers in MbuluMbulu –Karatu District

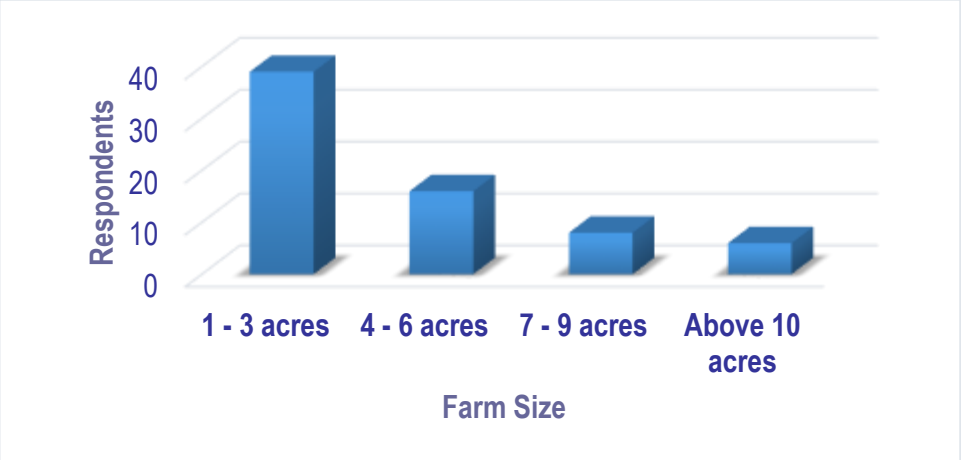


The figure above demonstrate the farm size owned by farmers in MbuluMbulu - Karatu District.It reveals that the majority of farmers own between 1acres to 3 acres who account 99(66%) of the total respondents.Also 21(14%) respondents said that they only own between 4 to 6 acres while 13% or 19 respondent said that they own acres ranging between 7 to 9 acres.Very few farmers had more that 10 acres this represented 11(7%) total respondents.

Table 9.3 Summary of individual Farmers owning Farm Land size - MbuluMbulu

Acres Owned by Farmers	1 acre to 3 acres	4 acre to 6 acres	7 acre to 9 acres	Above 10 acres
Total Respondent	99	21	19	11

Figure 9.2 Farm Size Owned By Farmers in Bargish Antsi-Mbulu

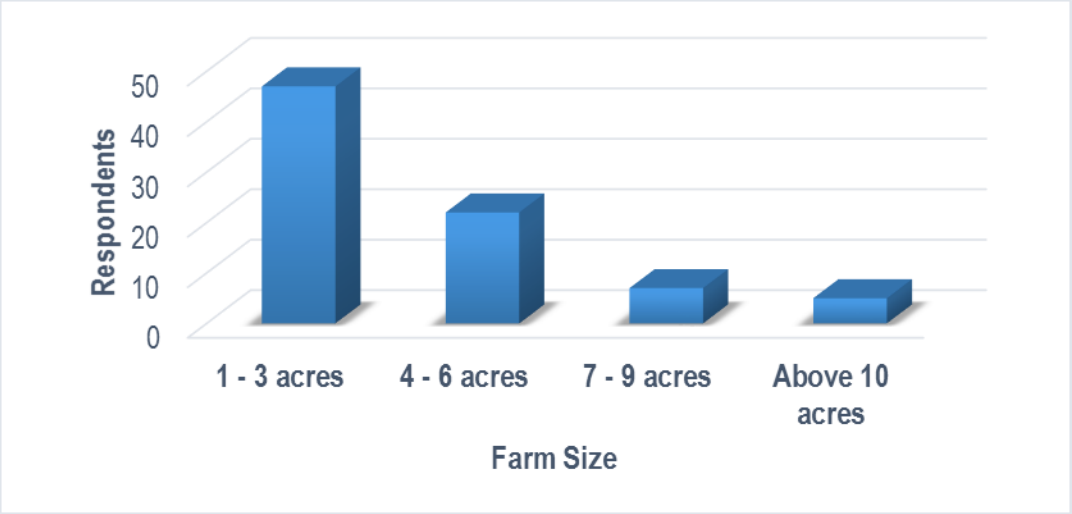


The figure above demonstrate the farm size owned by farmers in Bargish Antsi-Mbulu.It reveals that the majority of farmers own between 1acres to 3 acres who account 39 (57%)of the total respondents.Also 23% (16) respondents said that they only own between 4 to 6 acres while 11% or 8 respondent said that they own acres ranging between 7 to 9 acres.Very few farmers had more that 10 acres this represented 6 respondents or 9% of total respondents in the area.

Table 9.4 Summary of Individual Farmers Owning Farm Land Size-Bargish Antsi-Mbulu

Acres Owned by Farmers	1 acre to 3 acres	4 acre to 6 acres	7 acre to 9 acres	Above 10 acres
Total Respondent	39	16	8	6

Figure 9.3 Farm Size Owned By Farmers in Moringa Daudi-Mbulu



The figure above demonstrate the farm size owned by farmers in Bargish Antsi-Mbulu.It reveals that the majority of farmers own between 1acres to 3 acres who account 47 (58%) of the total respondents.Also 27% (22) respondents said that they only own between 4 to 6 acres while 9% (7) respondent said that they own acres ranging between 7 to 9 acres.Very few farmers had more that 10 acres this represented 5 respondents or 6% of total respondents in the area.

Table 9.5 Summary of individual Farmers owning Farm Land Size - Moringa Daudi-Mbulu

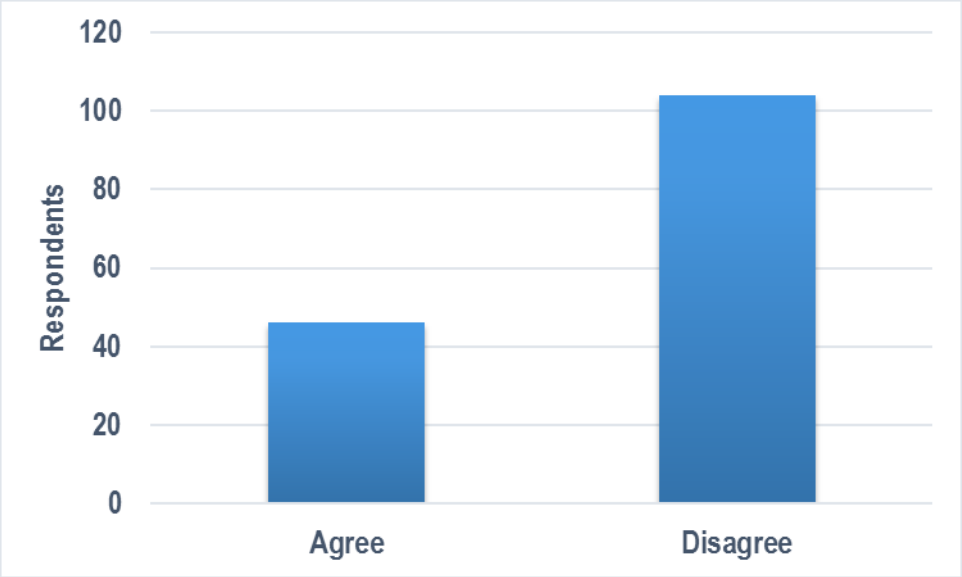
Acres Owned by Farmers	1 acre to 3 acres	4 acre to 6 acres	7 acre to 9 acres	Above 10 acres
Total Respondent	47	22	7	5

It is observed from the above findings that for all wards and villages visited majority of individual farmers own about and average of 1 acre to 3 acres and this is majority to all three villages visited.

9.5 Sustainability of Maize Farms

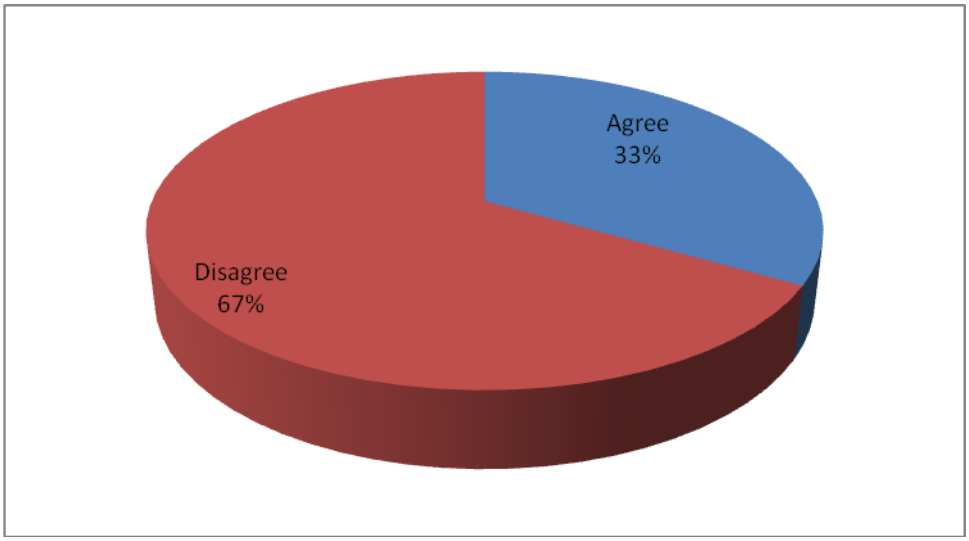
This was another area that was investigated by the researcher in order to examine the individual feelings regarding maize farm investment sustainability. The following was the major findings:

Figure 9.4 Maize Farm Sustainablity in MbuluMbulu - Karatu District



In examining whether maize farm ivestment is very sustainable nowdays majority of respondent from MbuluMbulu - Karatu District 104 (69%) respondent they disagee that maize farm investment is sustainable nowdays and the remaining 46 (31%) respondents they agreed that maize farm investment is sustainable.

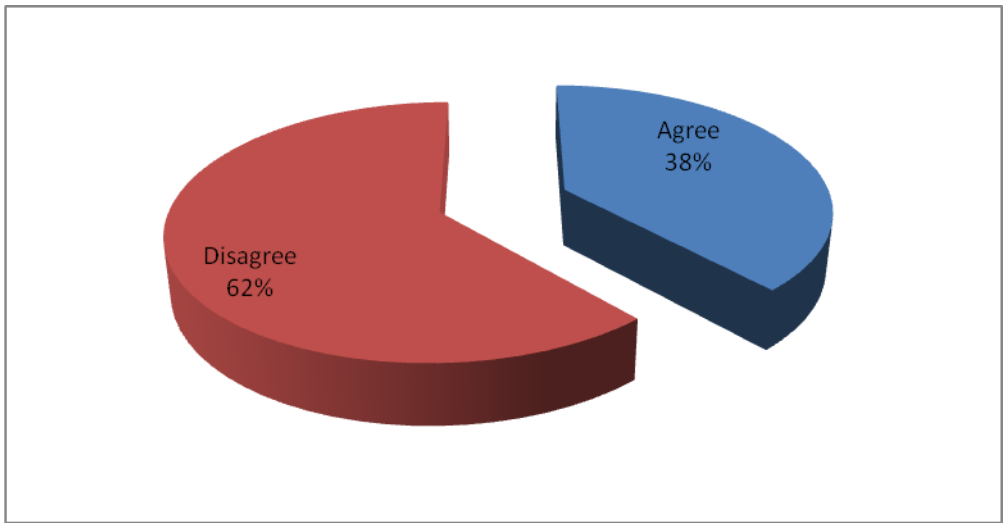
Figure 9.5 Maize Farm Sustainablity in Bargish Antsi-Mbulu District



Above figure demonstrate that 67%(46) respondents from Bargish Antsi-Mbulu District they disageree that maize farm investment is sustainable nowadays and

33%(23) of respondents agreed that maize farm investment is sustainable nowdays.Therefore with regards to Bargish Antsi-Mbulu District majority conclude that maize farm investment is not sustainable nowadays and disgree the statement that maize farm investment is sustainable.

Figure 9 . 6 Maize Farm Sustainablity in Moringa Daudi-Mbulu District



Above figure demonstrate that 62%(50) of respondents from Moringa-Mbulu District they disageree that maize farm investment is sustainable nowadays and 31 (38%) of respondents agreed that maize farm investment is sustainable nowdays.Therefore with regards to Moringa-Mbulu District majority conclude that maize farm investment is not sustainable nowadays and disgree the statement that maize farm investment is sustainable.

Therefore it is observed from the above respondents that majority disagree the point that farm investment is sustainable nowdays.This was found to valid to all three villages therefore it is concluded that the farm investment operating currently is not sustainable to farmers.

9.6 Maize Farm Profitability

Researcher also investigated whether individual farmers get good profit returns or not .Response from farmers provided diffent views and opinion regarding profitability as observed in each ward or district.

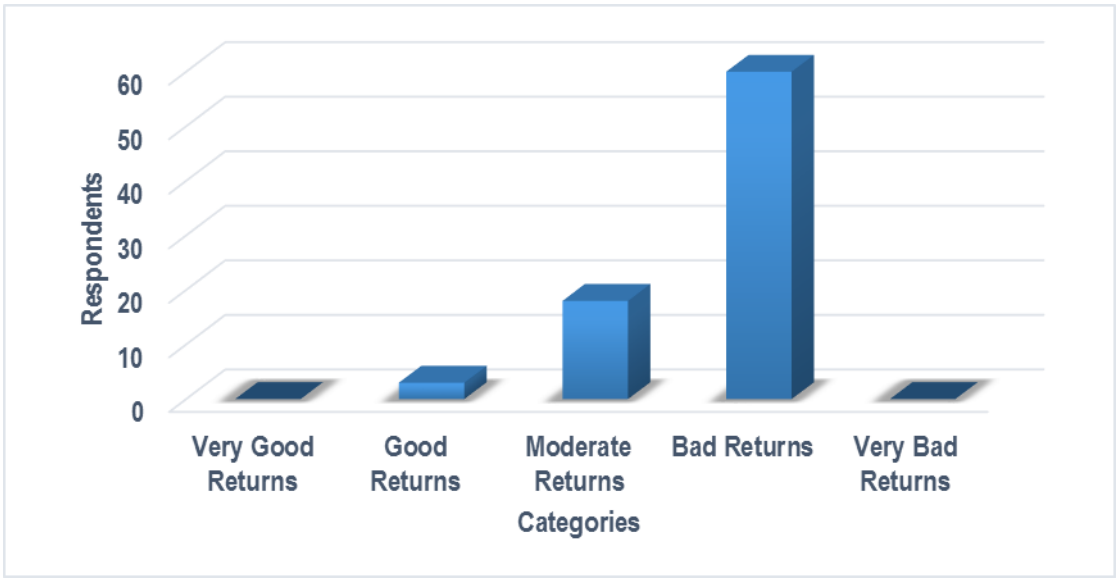
Figure 9.7 Describing Maize Farm Profitability from MbuluMbulu - Karatu District

The above figure demonstate very good returns,good returns,moderate retuns,bad returns and very bad returns on maize farm profitability.It is reveled from MbuluMbulu - Karatu District that 77 (51%) respondents said that there is bad returns when assessing the level of profit.Only 68(45%) respondents said that there is a modarate returns of profit on maize farms and 4(3%) respondents said that there is good retuns for maize farm profitability.Therefore based on the profitability assessment criterior from MbuluMbulu - Karatu District it conclude that there is bad returns when assessing the level of profit.

Figure 9:8 Describing Maize Farm Profitability in Bargish Antsi-Mbulu District

The above figure demonstate very good returns,good returns,moderate retuns,bad returns and very bad returns on maize farm profitability.It is reveled from Bargish Antsi-Mbulu District that 48(70%) respondents said that there is bad returns when assessing the level of profit for the maize farm.Only 4 respondents representing 6% said that there is a modarate returns of profit on maize farms and 1 respondent representing 1% said that there is good retuns for maize farm profitability.Also in this area 16 respondents representing 23% said that there is very bad profit retuns on maize farm investment in the area.Therefore based on the profitability assessment criterior from Bargish Antsi-Mbulu District it conclude that there is bad returns when assessing the level of profit which is validated by 48 respondents in the area.

Figure 9:9 Describing Maize Farm Profitability in Moringa - Mbulu District



The above figure demonstate very good returns,good returns,moderate retuns,bad returns and very bad returns on maize farm profitability.It is reveled from Moringa - Mbulu District that 60(74%) respondents said that there is bad returns when assessing the level of profit for the maize farm.Only 18 (22%) respondents said that there is a modarate returns of profit on maize farms and 3 (4%) respondent said that there is good retuns for maize farm profitability.Also in this area 0 respondents said none on whether there is very bad profit retuns on maize farm investment in the area and also no one respondend whether there is very good returns on profitability.Therefore based on the profitability assessment criterior from Moringa - Mbulu District it conclude that there is bad returns when assessing the level of profit on maize farm investment which is validated by 60 respondents in the area.

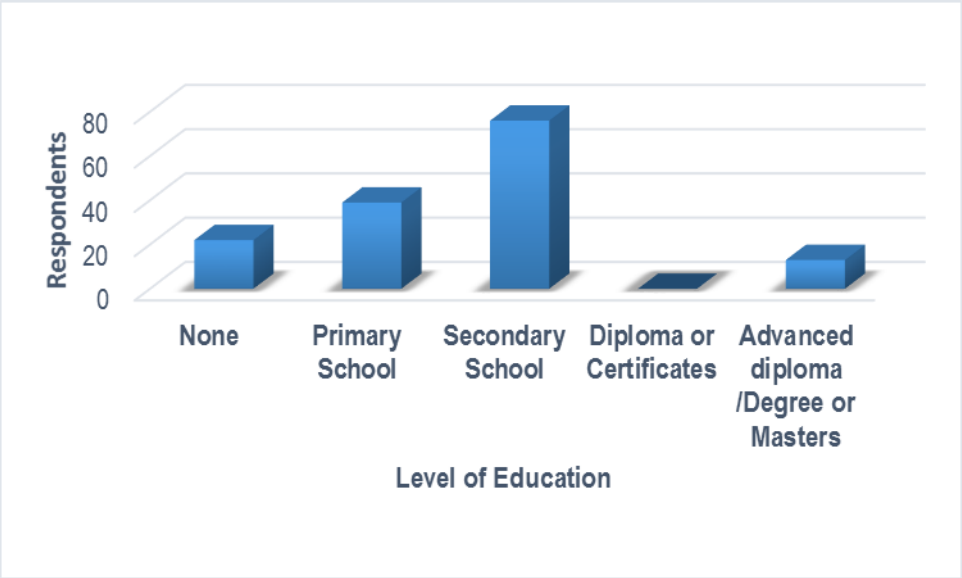
Therefore the general assessment and performance for all villages demonstrate that there is bad returns when assessing the level of profit on maize farm investment.the researcher probed further on why do they continue farming maize while they expect to get bad retuns ?majority were observed to participate into farming because they found their parent farming and therefore it has been

traditional that at least they are farming and profitability is not they main consideration.

9.7 Level of Education among Farmers Participating into Maize Farm Production

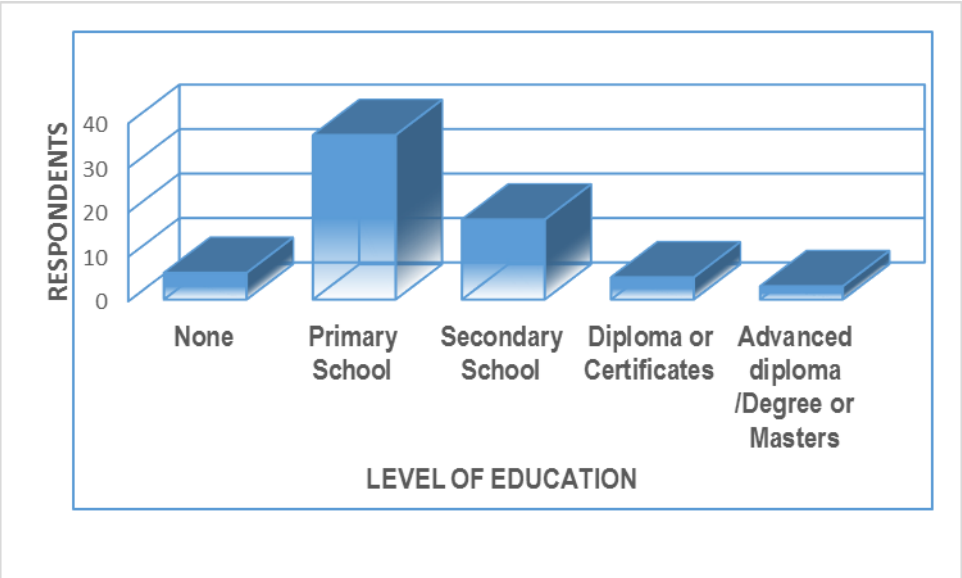
Education level amongindividual farmers participating in maize farm production in the areas was assessed.The researcher realised that the level of education also contribute much to the level of maize output.The following were the results:

Figure 9.10 Education Level from MbuluMbulu - Karatu District



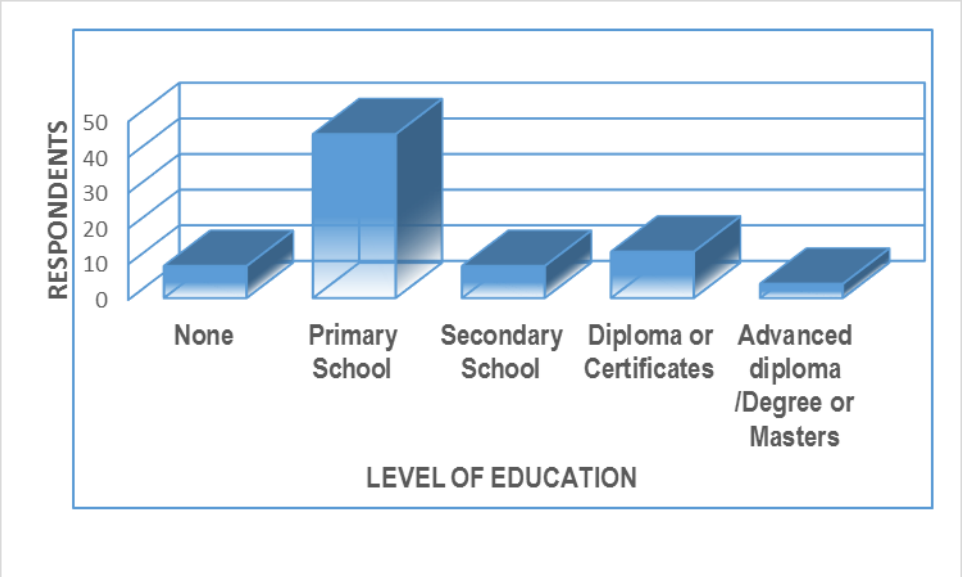
The above figure demonstrate the assessment of education among farmers producing maize in mbulumbulu Karatu District. It assess primary education, secondary education, diploma or certificate, advanced diploma /degree or masters for farmers participating in the production of maize farm. The figure reveals that 76(51%) respondents they had secondary school edication, 39(26%) respondents had primary school education, 22(15%) respondents had no any education,none of the respondents had diploma or certificates and 13(9%) respondents had advanced diploma or first degree or their masters.therefore it is observed that the level of education with farmers participating into maize production for mbulumbulu Karatu District is mainly dominated by secondary school level but again it reveals that there is a larger number of people without any education are still participating into maize production.

Figure 9.11 Education Level from Bargish Antsi-Mbulu District



The above figure demonstrates the assessment of education among farmers producing maize in Bargish Antsi-Mbulu District. It assesses primary education, secondary education, diploma or certificate, advanced diploma /degree or masters for farmers participating in the production of maize farm. The figure reveals that 18(26%) respondents they had secondary school education, 37(54%) respondents had primary school education, 6(9%) respondents had no any education, 5(7%) respondents of the respondents had diploma or certificates and 3 respondents representing 4% had advanced diploma or first degree or their masters.Therefore it is observed that the majority of individual farmers participating into maize farm production for Bargish Antsi-Mbulu District. is mainly dominated by Primary school level.

Figure 9.12 Education Level from Moringa - Mbulu District

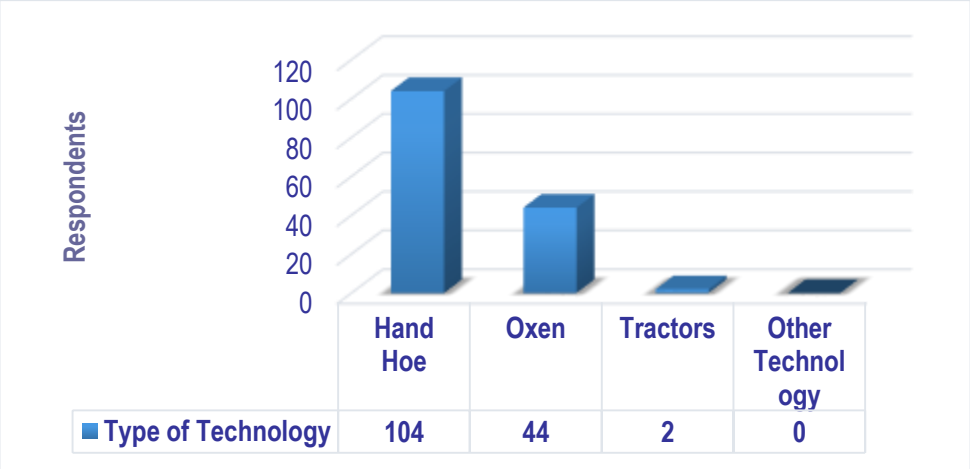


The above figure demonstrates the assessment of education among farmers producing maize in Moringa - Mbulu District. It assesses primary education, secondary education, diploma or certificate, advanced diploma /degree or masters for farmers participating in the production of maize farm. The figure reveals that 9 respondents representing 11% they had secondary school education, 46 respondents representing 57% had primary school education, 9 respondents representing 11% had no any education, 13 respondents representing 16% of the respondents had diploma or certificates and 4 respondents representing 5% had advanced diploma or first degree or their masters.Therefore it is observed that the majority of individual farmers participating into maize farm production for Moringa - Mbulu District is mainly dominated by Primary school level.

9.8 Current Technology Applied in Maize Farm Production

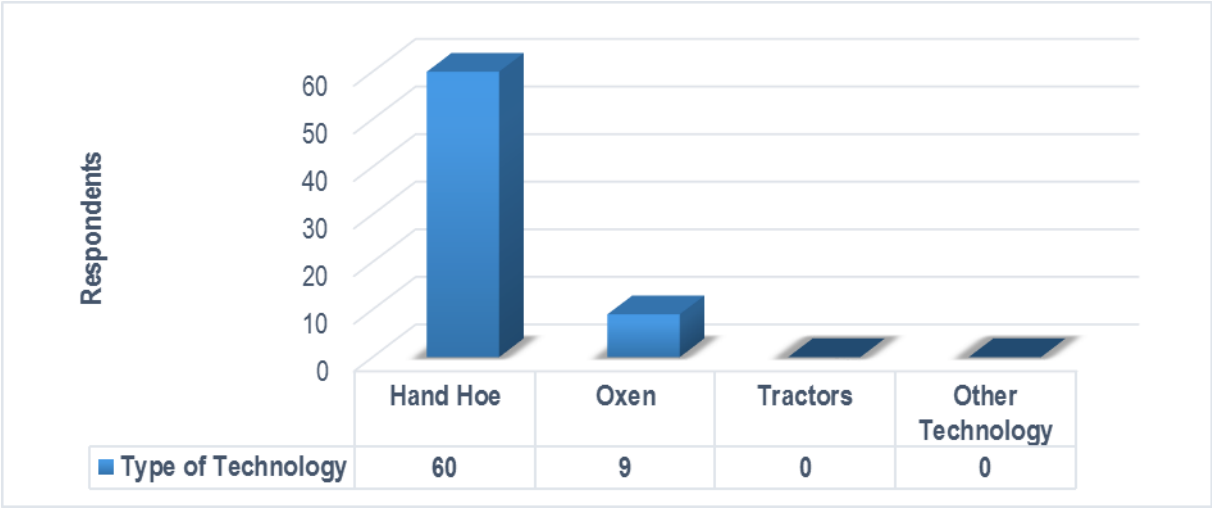
The researcher also assessed the current level of technology applied in maize farm production and the study revealed the following

Figure 9.13 Current Technology Applied in Maize farming for MbuluMbulu - Karatu District



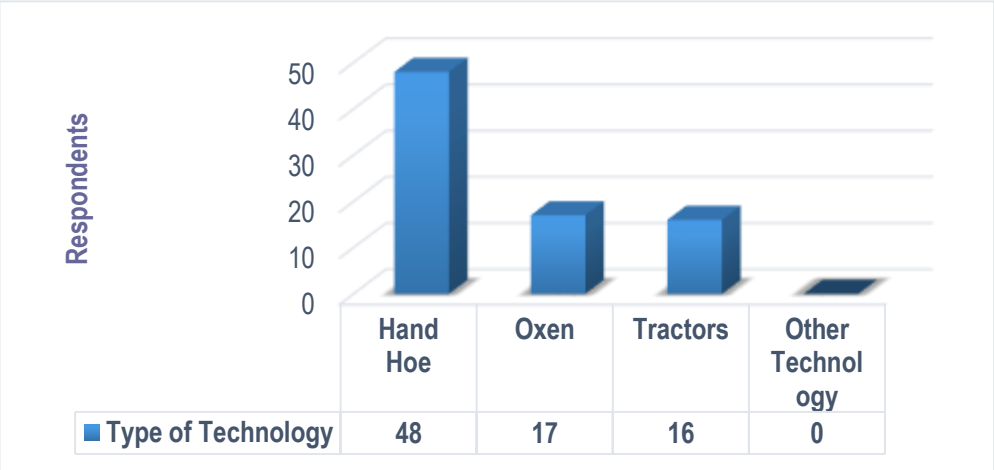
The above data for MbuluMbulu - Karatu District demonstrate that majority of farmers currently still use hand hoe into their farming.This is evidenced from the above figure that 104(69%) respondents still use hand hoe,44 (29%) respondent of respondents still use Oxen and very few individual apply tractors into their maize farms that represented 1% of respondent.This indicate that majority of respondents apply handhoe as a major technollogy that dominates maize farms in MbuluMbulu - Karatu District.

Figure 9.14 Current Technology Applied in Maize farming for Bargish Antsi-Mbulu District



The above data for Bargish Antsi-Mbulu District demonstrate that majority of farmers currently still use hand hoe into their maize farming.This is evidenced from the above figure that 60 respondents representing 87% still use hand hoe, 9 respondent representing 13% of respondents still use Oxen and none were found using tractor into their maize farms. This indicate that majority of respondents apply hand hoe as a major technollogy that dominates maize farms in Bargish Antsi-Mbulu District.

Figure 9.15 Current Technology Applied in Maize farming for Moringa - Mbulu District

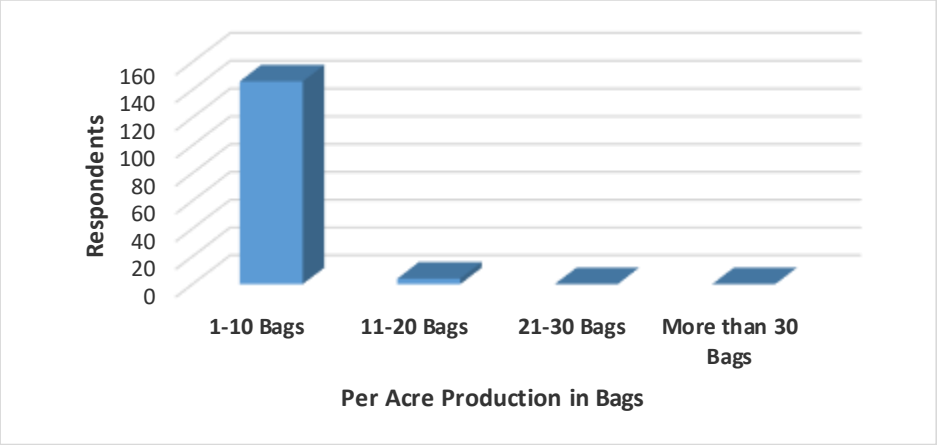


The above data for Moringa - Mbulu District demonstrate that majority of farmers currently still use hand hoe into their farming practice.This is evidenced from the above figure that 48(59%) respondents still use hand hoe,17 (21%) respondents still use Oxen and some individual farmers was observed to apply tractors into their maize farms that represented 16(20%) of respondents.This indicate that majority of respondents apply hand hoe as a major technollogy that dominates maize farms today in Moringa - Mbulu

9.9 Current Level of Maize Farm Output per One Acre Production

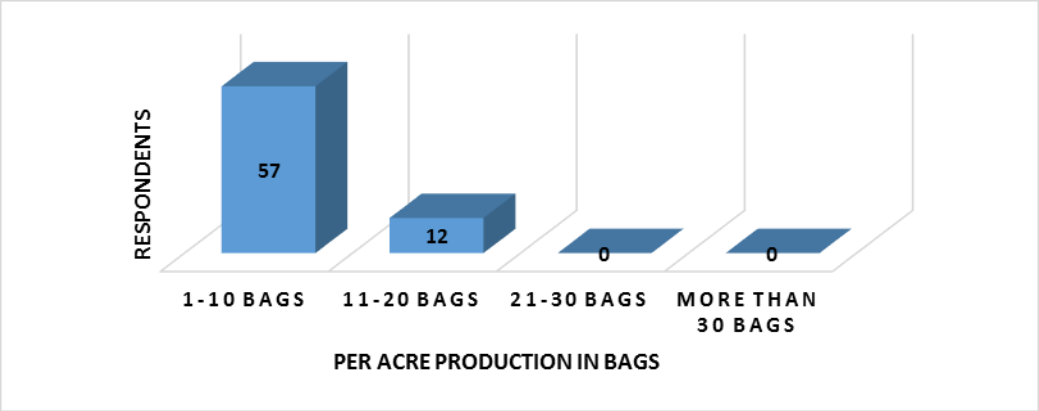
The researcher also investigated the current level of maize farm output per acre of production. This enabled the researcher to assess the current capacity of one acre in producing maize in Tanzania especially from the northern part of the country where maize is the major product. The analysis below provide the picture of the current level of output per acre;

Figure 9.16 Current Level of Output Per One Acre Production of Maize MbuluMbulu - Karatu District (1 bag=100KG)



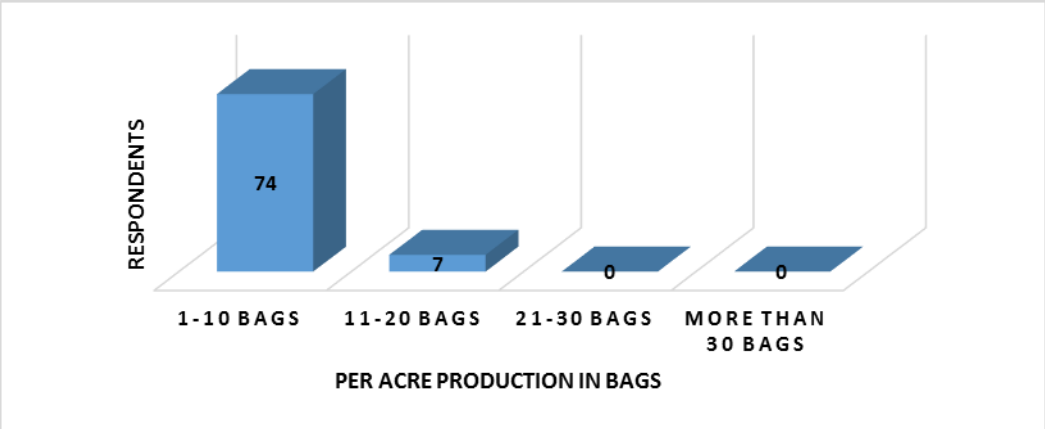
The above figure reveals that the current level of maize farm harvest and output per one acre of maize farm production ranges between 1 bag to 10 bags as commented by 146 respondent representing 97% and 4 respondents said that they only get harvest of between 11 to 20 bags per acre.

Figure 9.17 Current Level of Output Per One Acre Production of Maize Bargish Antsi –Mbulu district (1 bag=100KG)



The above figure reveals Bargish Antsi –Mbulu district on the current level of maize farm harvest and output per one acre of maize farm production ranges between 1 bag to 10 bags maximum yield as commented by 57 respondent representing 83% and 12 respondents representing 17% said that they only get harvest of between 11 to 20 bags per acre. Researcher probed further on why there is a low yield given their farm size, among the reasons identified was poor quality of seeds and soil infertility as the main contributing factors towards increasing output,

Figure 9.18 Current Level of Output Per One Acre Production of Maize Moringa –Mbulu district (1 bag=100KG)

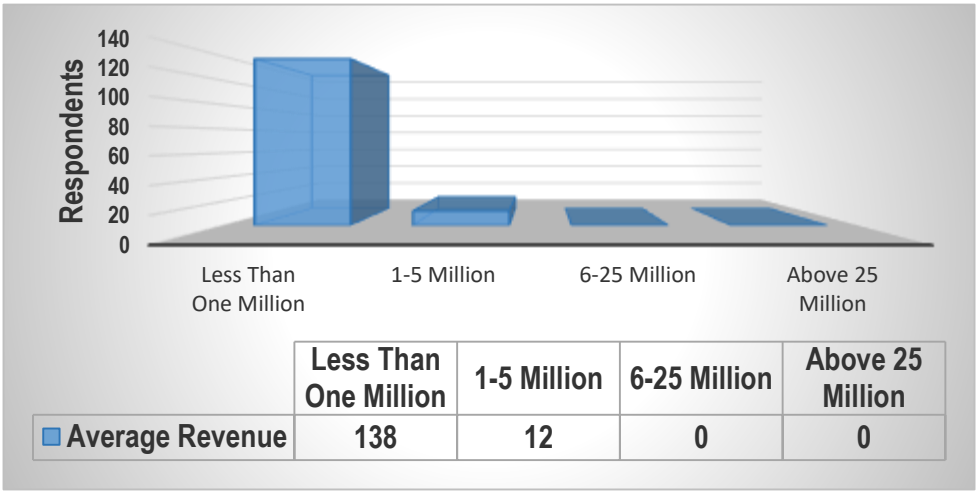


The above figure reveals Moringa –Mbulu district on the current level of maize farm harvest and output per one acre of maize farm production ranges between 1 bag to 10 bags maximum yield as commented by 74 respondents representing 91% and 7 respondents representing 9% said that they only get harvest of between 11 to 20 bags per acre as their maximum yield for one acre of maize.

9.10 Average revenue for the Maize Farm Investment

Researcher also investigated on the average revenue that farmer are getting per year as income generated from sales of maize farm. The following was observed;

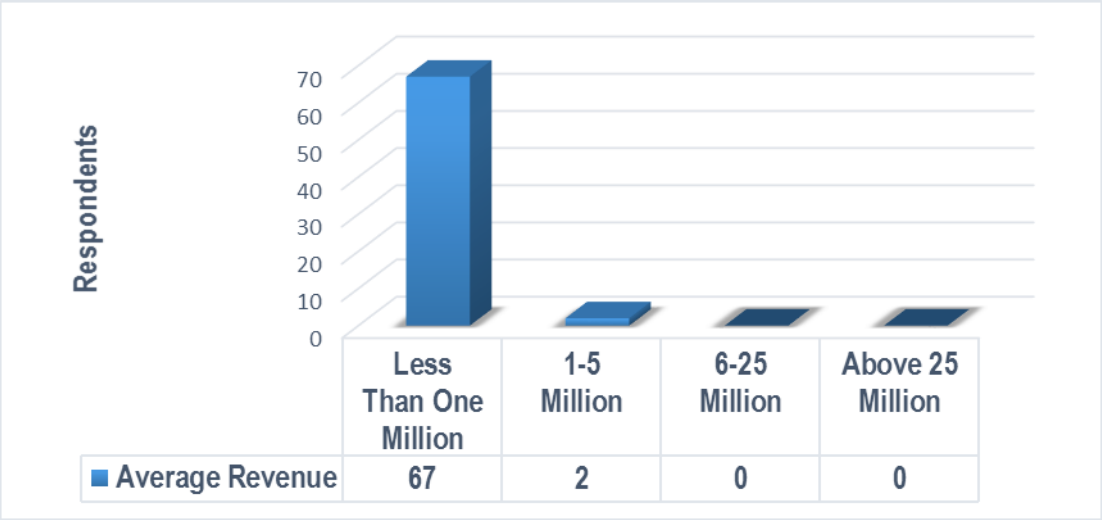
Figure 9.19 Average Revenue received by Farmers per Year MbuluMbulu - Karatu



	Less Than One Million	1-5 Million	6-25 Million	Above 25 Million
Average Revenue	138	12	0	0

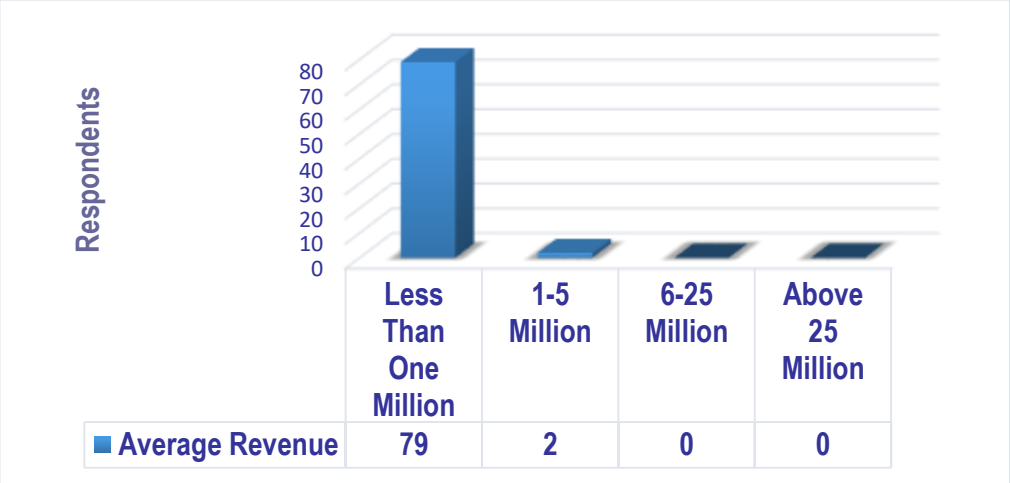
The above figure reveals MbuluMbulu - Karatu district on the average revenue received by individual farmers in the area surveyed for the maize farm. The figure demonstrate that the current average revenue received by individual farmers in the area is less than one million Tanzania shillings representing 138 respondents who represented 92% . But the study reveals that very few individual farmers with the average income ranging between one million to five million who represented only 12 respondents or 8% in the area. Taking the exchange rate of US $ 1=2195 Tsh generally it indicate that the maximum average revenue received by farmer after their harvest is US $ 456 which is very low income to meet their daily needs per year. The researcher observed that their income is also supplemented by cattle keeping and poultry otherwise maize farm alone cannot justify the household's expenditure on medical, education for their kids, daily meals, transport, communication etc.

Figure 9.20 Average Revenue received by Farmers per Year in Bargish Antsi-Mbulu



The above figure reveals Bargish Antsi-Mbulu district on the average revenue received by individual farmers in the area surveyed for the maize farm. The figure demonstrate that the current average revenue received by individual farmers in the area is less than one million Tanzania shillings representing 138 respondents who represented 97% . But the study reveals that very few individual farmers with the average income ranging between one million to five million who represented only 2 respondents or 3% in the area. Taking the exchange rate of US $ 1=2195 Tsh generally it indicate that the maximum average revenue received by farmer after their harvest is US $ 456 which is very low income to meet their daily needs per year. The researcher observed that their income is also supplemented by cattle keeping and poultry otherwise maize farm alone cannot justify the household's expenditure on medical, education for their kids, daily meals, transport, communication, clothing etc

Figure 9.21 Average Revenue received by Farmers per Year in Moringa – Mbulu



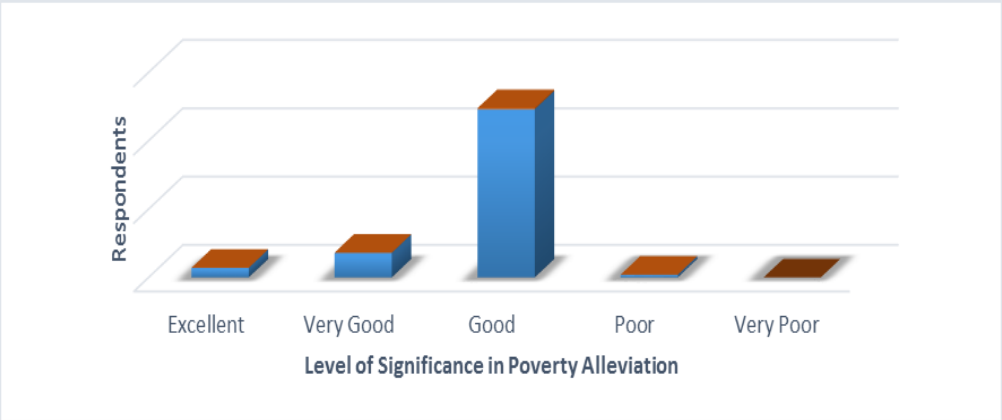
The above figure reveals Moringa Daudi-Mbulu district on the average revenue received by individual farmers in the area surveyed for the maize farm. The figure demonstrate that the current average revenue received by individual farmers in the area is less than one million Tanzania shillings representing 79 respondents who represented 98% . But the study reveals that very few individual farmers with the average income ranging between one million to five million who represented only 2 respondents or 2% in the area. Taking the exchange rate of US $ 1=2195 Tsh generally it indicate that the maximum average revenue received by farmer after their harvest is US $ 456 which is very low income to meet their daily needs per year. The researcher observed that their income is also supplemented by cattle keeping and poultry otherwise maize farm alone cannot justify the household's expenditure on medical, education for their kids, daily meals, transport, communication, clothing etc

Therefore the average maximum income to all three villages received is US $ 456 and is not enough to meet their expenditure. Among the contributing factors to the low income or revenue observed to be linked to poor quality of maize seeds, fake seeds, late distributions of agricultural inputs lake fertilizers, lower rainfall or climate change, soil infertility, poor farm technology and fertilizer

9.11 Significance of Agriculture in Poverty Alleviation

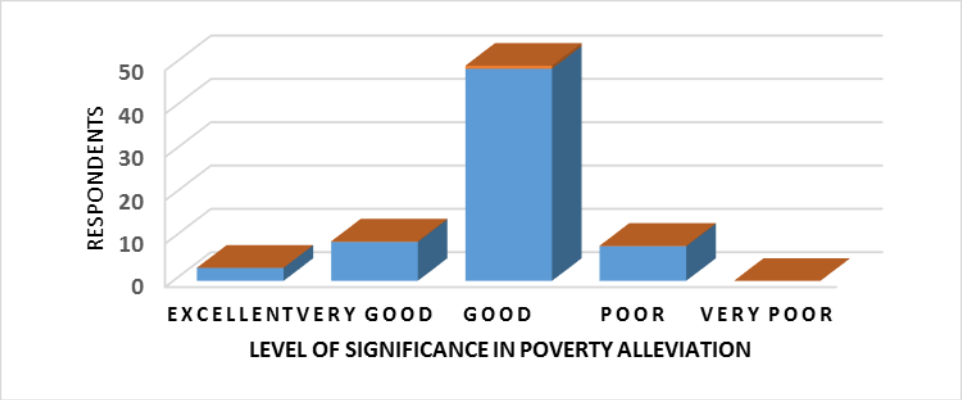
Researcher investigated on the significance of maize production on poverty alleviation and farmers were requested to rate whether agriculture is excellent investment in poverty alleviation, Very good in poverty alleviation, Good or poor in poverty alleviation. The response was as follows:

Figure 9.22 Significance of Agriculture in Poverty Alleviation MbuluMbulu Karatu District



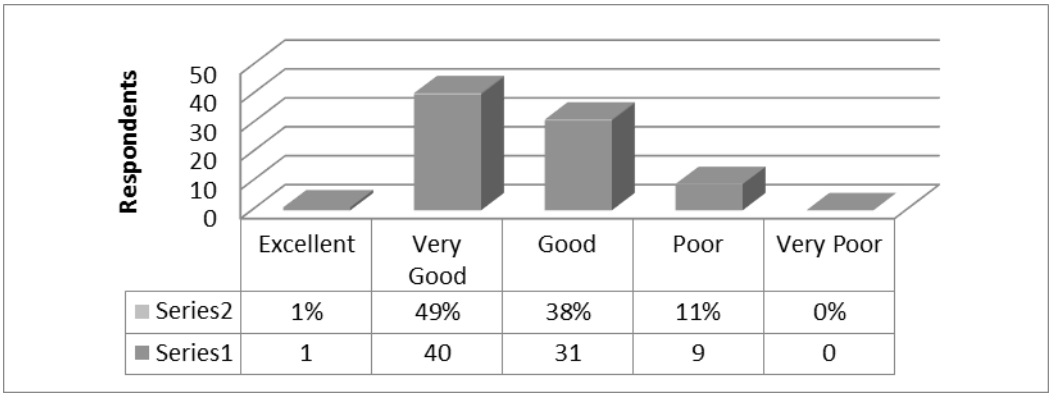
The above figure demonstrate farmers from MbuluMbulu Karatu district on the significance of agriculture in poverty alleviation.123 respondents representing 82% rated the significance of agriculture as good investment in poverty alleviation and 18 respondent representing 12% rated very good investment in poverty alleviation, only 7 respondents said agriculture investment is excellent in poverty alleviation. Rating it from good to excellent means agriculture is significant in poverty alleviation. But the researcher observed individual farmers in rural area still appreciate the significance of agriculture in poverty alleviation since it is a means of livelihood despite lower yield.

Figure 9.23 Significance of Agriculture in Poverty Alleviation Bargish Antsi - Mbulu district



The above figure demonstrate farmers Bargish Antsi - Mbulu district on the significance of agriculture in poverty alleviation.49 respondents representing 71% rated the significance of agriculture as good investment in poverty alleviation and 9 respondents representing 13% rated very good investment in poverty alleviation only 3 respondent representing 4% said agriculture investment is excellent investment in poverty alleviation. Rating from good to excellent means agriculture is significant in poverty alleviation. But the researcher observed individual farmers in rural area still appreciate the significance of agriculture in poverty alleviation since it is a means of livelihood despite lower yield.

Figure 9.24 Significance of Agriculture in Poverty Alleviation Moringa - Mbulu district



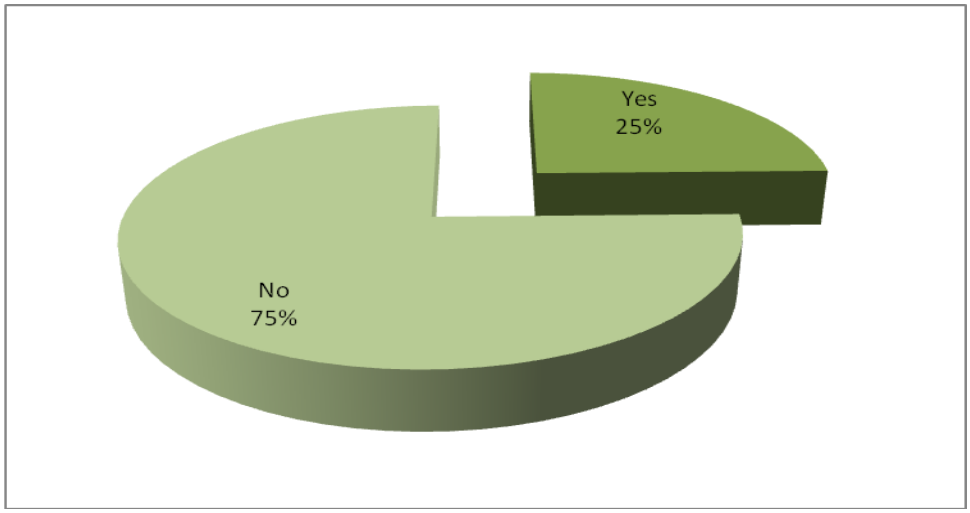
The above figure demonstrate farmers in Moringa Village in Mbulu district on rating the significance of agriculture in poverty alleviation.38 respondents

representing 11% rated the significance of agriculture as good investment in poverty alleviation and 40 respondents representing 49% rated very good investment in poverty alleviation only 1 respondent representing 1% said agriculture investment is excellent investment in poverty alleviation. Rating from good to excellent means agriculture is significant in poverty alleviation and very few respondents rated agriculture as poor as the data above reveal. But the researcher observed individual farmers in rural area still appreciate the significance of agriculture in poverty alleviation since it is a means of livelihood despite lower yield.

9.12 **Government Support to Farmers**

The researcher also investigated on the government support provided to farmers currently and examine whether the support provided is enough to increase agricultural output or not. The following were the results;

Figure 9.25 Government Support and Subsidies - MbuluMbulu Karatu Farmers



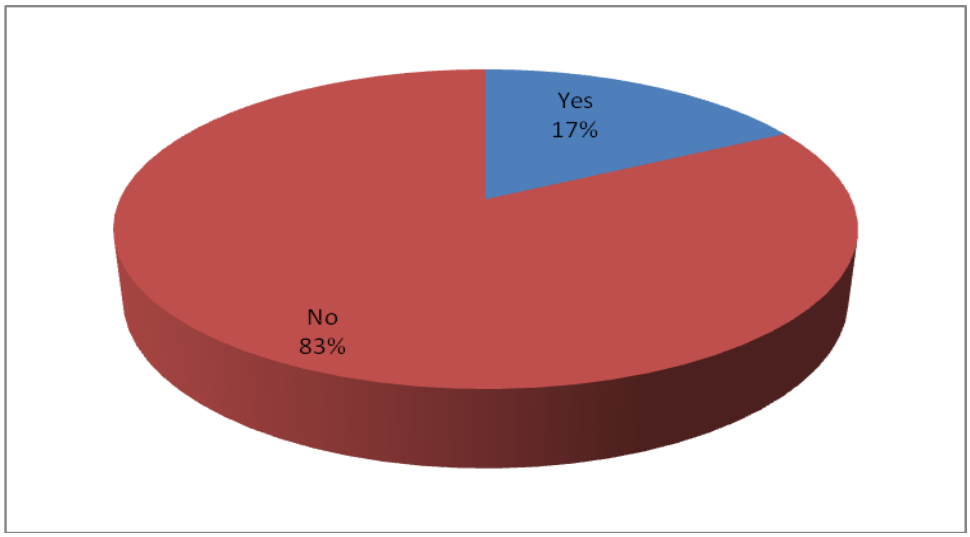
The above figure demonstrates government support and subsidies to MbuluMbulu Karatu farmers with those who receive government subsidies and those who do not get government subsidies. Those who get government subsidies replied YES and those who do not get government subsidies replied NO. Therefore the figure shows that there 113 respondents representing 75% said that they do not get any subsidies from the government while 37% of respondents

representing 25% said Yes, they receive government subsidies from the government.

Among those who said that they receive government subsides when asked on the amount how much is the government subsidies it was revealed that the subsidy amount ranges between 10,000 to 50,000 or expressed in US currency is between $ 5 to $23 taking the exchange rate of US $ 1=2195 Tsh. This was observed to be the maximum amount given to those qualified farmers as subsidies.

When discussing with the ward government executives claimed that the government has been supporting farmers 20% of a price of one bag of fertilizer per household family currently was 15,200/= equivalent to US $ 7 per house hold. Even though it was realize that it is difficult for individual farmers to determine the actual subsidies since this is reflected in the subsidies price of a fertilizer for 20% reduction of one bag per house hold.

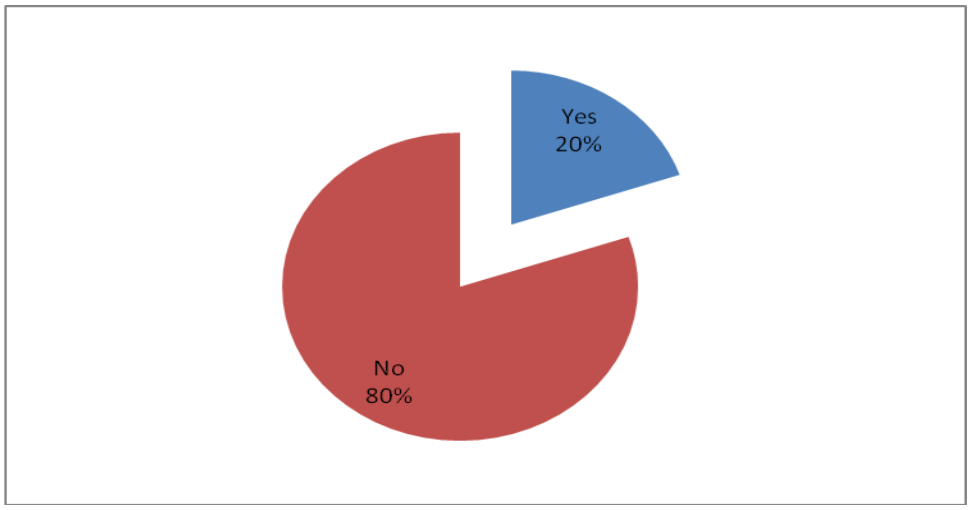
Figure 9.26 Government Support and Subsidies – Bargish Antsi – Mbulu Farmers



The above figure demonstrates government support and subsidies to Bargish Antsi – Mbulu farmers with those who receive government subsidies and those who do not get government subsidies. Those who get government subsidies replied YES and those who do not get government subsidies replied NO. Therefore the figure shows that there 57 respondents representing 83% said that

they do not get any subsidies from the government while 12 respondents representing 17% said Yes, they receive government subsidies from the government.

Figure 9.27 Government Support and Subsidies – Moringa Mbulu Farmers



The above figure demonstrates government support and subsidies to Moringa Mbulu Farmers with those who receive government subsidies and those who do not get government subsidies. Those who get government subsidies replied YES and those who do not get government subsidies replied NO. Therefore the figure shows that there are 65 respondents representing 80% said that they do not get any subsidies from the government while 16 respondents representing 20% said Yes, they receive government subsidies from the government.

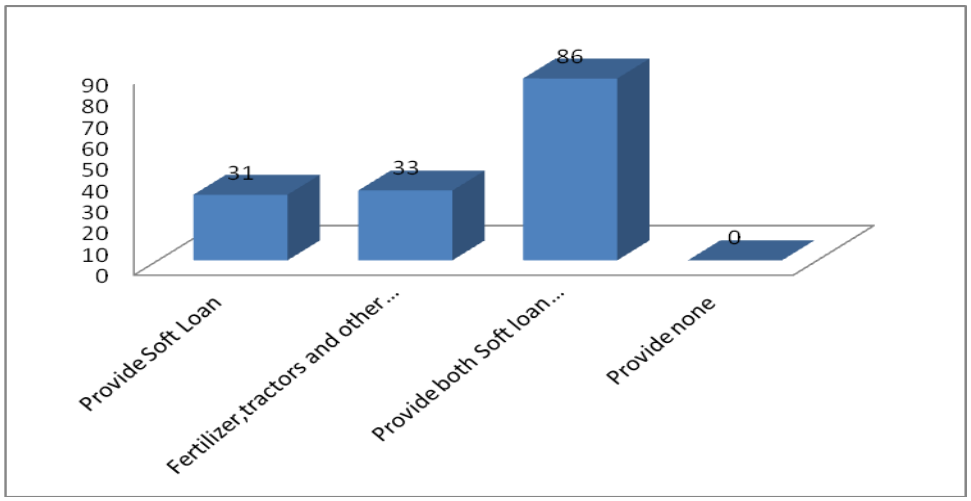
It is observed from finding that the contribution by the government in supporting farmers has been always very low despite policies that support farmers, very little is done to deliberate improve maize farming with reasonable subsidies that will ensure maize farm growth in rural areas.

9.13 The Role of the Government in Promoting Maize Farm Investment

The role of the government in promoting maize farm production is central and it should not be ignored for the poor nation like Tanzania where more than 80% of the workforce is engaged in agriculture and maize is the main food staple.

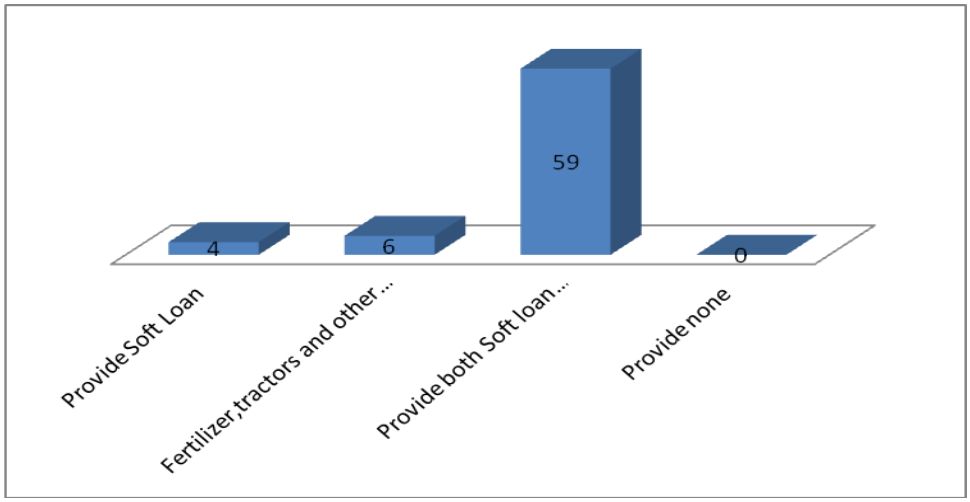
Therefore there risk if maize farm is not supported by the government farmers may either quite maize farm or engage to other unproductive activities. In this context the research asked farmers to examine on what should be the role of the government in promoting maize farm and the response was as follows;

Figure 9.28 Role of the Government in Promoting Maize Farm in MbuluMbulu-Karatu



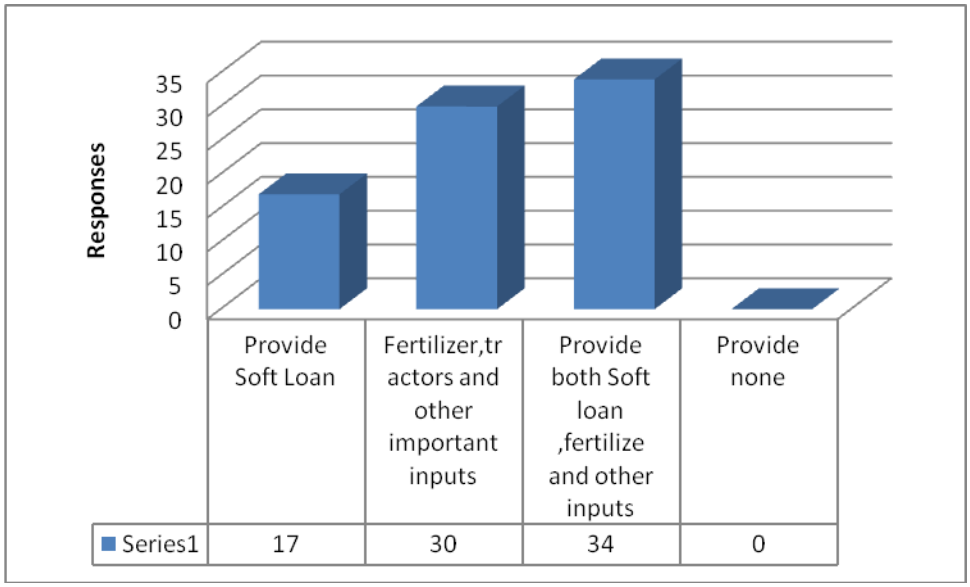
The above figure demonstrates individual farmers comments in MbuluMbulu-Karatu on the role of the government in promoting maize farm in their areas. It reveals that there are 86 respondents representing 57% said that the government must provide both soft loan, fertilizer and other inputs to support the growth of maize in the area. 33 respondents representing 22% said that if the government can provide only fertilizer and tractors and other inputs maize production will grow. But 31 respondents representing 21% said that if they can only get a soft loan that is guaranteed by the government then maize production must increase. Based in this survey it is concluded that the government must provide both soft loan, fertilizer and other inputs to support the growth of maize as responded by the majority in MbuluMbulu-Karatu.

Figure 9.29 Role of the Government in Promoting Maize Farm in Bargish Antsi-Mbulu



The above figure demonstrates individual farmers comments in Bargish Antsi-Mbulu on the role of the government in promoting maize farm in their areas. It reveals that there are 59 respondents representing 86% said that the government must provide both soft loan, fertilizer and other inputs to support the growth of maize in the area. 6 respondents representing 9% said that if the government can provide only fertilizer and tractors and other inputs maize production will increase. But 4 respondents representing 6% said that if they can only get a soft loan that is guaranteed by the government then maize production must increase. Based in this survey it is concluded that the government must provide both soft loan, fertilizer and other inputs to support the growth of maize as responded by the majority in Bargish Antsi-Mbulu

Figure 9.30 Role of the Government in Promoting Maize Farm in Moringa - Mbulu



The above figure demonstrates individual farmers comments in Moringa village - Mbulu on the role of the government in promoting maize farm in their areas. It reveals that there are 34 respondents representing 42% said that the government must provide both soft loan, fertilizer and other inputs to support the growth of maize in the area. 30 respondents representing 37% said that if the government can provide only fertilizer and tractors and other inputs maize production will increase. But 17 respondents representing 20% said that if they can only get soft loan that is guaranteed by the government then maize production must increase. Based in this survey it is concluded that the government must provide both soft loan, fertilizer and other inputs to support the growth of maize as responded by the majority in Moringa village - Mbulu

Observations from all three villages it demonstrate that there must be a government support to maize producers through provision of both soft loan, fertilizer and other inputs to support the growth of maize as responded by the majority. The government can provide affordable fertilizers and other inputs like quality seeds can be a good strategy. Also the researcher observes that there is a great untapped potential of farmers to utilize the underground water and this technology of utilizing underground water must be supported by the government to the larger extent.

9.14 Maize Farm Viability and Need for Gold to Account for Agricultural Growth

The researcher investigate in detail on the current situation of farmers on their cost and benefits of their investment and examine viability to establish financial gap requirement and other constraints for the investment given the status of gold export in the country. Maize farmers cost and benefits analysis used to examine the maize farm investment in some cases simulated and NPV formulae applied to individual farmers to examine this trend whether the venture on maize farm is viable or not and help probing the financial gap and requirements that farmers are facing to attain viable investment.

The researcher requested farmers to estimate their cost and benefits of maize farm per acre production of output as stipulated in the questionnaire form attached. Farmers discussed in details about the cost and filled those cost in the specified form of the questionnaires under the guidance of the researchers. Among the cost that were discussed it includes labor cost, fertilizer cost, seeds, planting cost, land clearing, guarding, pesticides, cultivation, weeding, storage cost, oxen cost marketing cost, transport, interest rate, rent, taxes, communication, electricity and any other expenses.

Farmers Behaviors Towards Cost

Initially most farmers cost incurred like cultivation, planting, storage cost, oxen cost was not taken as part of the cost but after discussion they realized that there is need to account for those cost despite of using family labour or their own oxen it must be accounted for in monetary form as stipulated in the attached questionnaires. It is where they realize the total cost. See the selected cost for each individual farmers in the area visited. The cost estimated was assumed to be fixed for the years estimated. All farmers visited non was found keeping records of cost of farming.

Revenue Estimation and Profit

Farmers recalled back their total amount of bags of maize harvested and sold in previous years and the maximum price sold in that year was also identified by individual farmers and filled in the form under the guidance of researchers. Based

on the estimated revenue and cost farmers were also requested to examine in their calculations whether they are making profit or loss .See the attached for estimated cost and revenue for each selected farmers in the villages

Observations on Profitability

When all cost and revenue is taken into account it was found that most farmers are operating at a loss given the output level per acre of production of maize. It is concluded that farmers are producing without knowing that they are making a loss.

Given the lower level of output per acre of production the study reveals that the maize farm investment in the visited villages is not viable since cost is greater than revenue. Even we take consideration of the 19% interest rate still the investment is not viable as shown here below

The following will be the formulae being applied to examine the situation;

Where: $$NPV = -C_0 + C_1 \frac{1}{(1+r)} + \ldots\ldots + C_n \frac{1}{(1+r)^n}$$

C_0= Initial Capital

C_1= Cash flow in year one

C_n= Cash flow at time n

Decision Criteria

NPV < 0 Reject the maize farm investment proposal i.e not viable

NPV ≥ 0 Accept the farm Investment proposal i.e it is viable

8:19: 4 Assumption and Hypothesis

The researcher decided to simulate the same cost and revenue projected by farmers on the basis that now farmer can borrow money from the commercial bank at 19% lending rate(r).

Hypothesis

- Farm investment in maize(Main agriculture product in Tanzania) is feasible and viable

H_0: Farm investment in Maize is technically feasible and viable

$H_{1:}$ Farm investment in Maize is technically not feasible and viable

Therefore based on the table below demonstrate that the current maize farm investment is not technically feasible and viable in most villages. Therefore the researcher rejects the hypothesis that current farm investment is technically feasible, viable investment and therefore there is no need for Gold revenue to account for agriculture investment. Based on the NPV criteria most individual maize farm investment are rejected once simulated. With the exceptional cases from Bargish Antsi,farmer two(2) and Six(6) their maize investment were viable investment when simulated. Likewise in Moringa Mbulu individual farmer eight(8), their maize farm investment is also viable. Generally it appear that most farmers are engaged in subsistence farming and whether maize farm viable or not is none of their consideration.

The following were the results of NPV computation by using excel spread sheet reveals:

Table 9.6 Criteria for Rejecting or Accepting the Farm Investment

Village/Ward	Farmer	NPV	Criteria
MbuluMbulu-Karatu	Individual farmer1	-222831.0	Reject
	Individual farmer2	-322143.3	Reject
	Individual farmer3	-416609.1	Reject
	Individual farmer4	-169376.9	Reject
	Individual farmer5	-297591.1	Reject
	Individual farmer6	-224237.6	Reject
	Individual farmer7	-13464.3	Reject
	Individual farmer8	-824153.0	Reject
	Farmer	NPV	Criteria
Bargish Antsi-Mbulu	Individual farmer1	-545807.2	Reject
	Individual farmer2	10206.6	Accept
	Individual farmer3	-557226.4	Reject
	Individual farmer4	-595940.2	Reject
	Individual farmer5	-395075.4	Reject
	Individual farmer6	109018.5	Accept
	Individual farmer7	-388261.0	Reject
	Individual farmer8	-505274.8	Reject
	Individual farmer9	-97053.6	Reject
	Farmer	NPV	Criteria
Moringa-Mbulu	Individual farmer1	-550561.7	Reject
	Individual farmer2	-912290.6	Reject
	Individual farmer3	-530623.9	Reject
	Individual farmer4	-735891.5	Reject
	Individual farmer5	-612058.2	Reject
	Individual farmer6	-704713.8	Reject
	Individual farmer7	-570950.2	Reject
	Individual farmer8	22658.4	Accept
	Individual farmer9	-855330.0	Reject

It is advisable that the only way to accept maize farm investment is to increase output to at least 40 bags per acre or increase price of maize per KG farmer can then realize positive NPV. The government should also see the way to reduce interest rate from financial institutions so that maize farm can grow.

9.15 Key Constraints Identified by all Maize Farmers

Farmers surrounded with constructed thatched houses with mud walls is found to be common picture among farmers. It suggest that gold export has a role to play to account for agricultural growth in Tanzania and fill the gaps required by farmers since 80% of the work force in Tanzania is engaged in agriculture.High records of GDP in Tanzania can be useless if farmers are still living in a difficult environment in increasing their output and income. The following are the key challenges identified by farmers in all three villages visited of Mbulumbulu Village of Arusha region,Moringa and Bargish ants in Mbulu district of Manyara region;

Quality Maize Seed

This was identified as the major problem hindering the maize production and yield.Some farmers have been planting seeds that has been distributed by the government agents and the seeds found to be fake.It accompanied with less maize harvest.Farmers insisted that the government must guarantee them with the quality of seed being distributed the agents and the variety of seeds must be communicated to farmer for the best output.

Soil Infertility

Farmers complain that the soil has been cultivated for years with the maize farms so it is infertile therefore the government must advice farmers with soil fertility technique or identify new product in the area..

Climate Change

Bad weather accompanied by drought has also been the major problem facing maize farmers in the area.But during the interview farmers recommended the use of underground water can be the best strategy to overcome climate change in the area.The government must support farmers with boreholes and reserve tanks to support maize farm irrigation with the use of underground water.

Farm Technology

From independence to date farmers has been using hand hoe as the major technology that dominate maize farming.The use of hand hoe has been the major contributing factor towards maize output. At this century the government must enterven in support farmers with modern farming tools including tractors and other modern agricultural input to make it attractive to individual farmers in the areas.

Fertlizer and Agricultural inputs

Late distribution of fertilizer and other agricultural inputs was observed to be another challenge for maize growth in the area.

Government restrictions and Pricing

Price of maize per KG is the one that will maximize farmers revenue or income.The higher the price the better income to farmers.With places where there is high prices will benefit maize farmers and impove their income. But goverment has been setting restriction to farmers not to export maize to nearby countries where price of maize per KG is promising unless with specific permission and compel farmers to sell domestically where price is very low hence worsening farmers income.Therefore government restriction hinder growth of maize production and profitability.

Again it was revealed as a challenge that many farmers do not sell in KG of maize but they sell per bag of maize where one bag can be more than 100 KG and this is benefiting the buyer the maize producer is losing.Improving maize price in the areas will improve farmers income.

Lack of agriculture business education entrepreneurship and Marketing

Lack of agriculture business and entrepreneurship is another area that farmers are facing.Their participation in maize farm production has generally been traditional and practice has been inherited from their parents and history.Their found their mother and fathers farming maize and they find themselves also farming maize without taking any analysis whether maize is profitable investment or

not.Therefore lack of proper education on agriculture business education hinder growth of maize output.

Again when they produce they are being cheated with brokers who come from big cities and cheat farmers with lower prices,therefore lack of marketing information hinder the growth of maize.

Subsidies

Subsidies given to maize farmers by the government is very low and cannot justify growth in the maize production.It is suggested that the government must prepare for the big push with subsidies to support growth of maize in the area.Goverment has the capability to subsidize farmers on strategic areas of their agriculture inputs including bore holes, water reserve tank for irrigation,fertilizer,pesticides etc.

Infrastructure and Transport

Transport and road infrastructure is another challenge that maize farmers are facing in rural areas and the point of their farms.Road is poor and farmers use their own means with the help of two wheel carts driven by cattle is the common transport that farmers are using.The two wheel cart pulled by cattle is used to for carrying harvest and other activities from their field farms to the market. Given the gold deposit the government can improve infrastructure in rural areas.

9.16 CONCLUSION AND RECOMMENDATIONS

9.16.1 Conclusion

Despite the difficult living condition of individual farmers in the areas of Arusha-Karatu District (Mbulumbulu ward the village of Kambi ya Simba), Manyara - Mbulu District in the village of Bargish antsi and Moringa –Daudi ward farmers still believe that agriculture is the main activities that if supported by the government it can assist in reducing poverty among majority. It is observed that the contribution from the government has been very low as compared to the agricultural potential in the area. Poor quality of seeds, lower level of technology and education has been among the contributing factor for poor maize harvest in

the areas and sustainability of maize farm. The study also reveals that the engagement of farmers in maize farm has been inherited from parents and very traditional from long time no commercialization of agriculture has been taken into account that is why there is poor returns on the investment. Lower output per acre of production was observed to be the major problem among respondents.

It is observed from finding that the contribution by the government in supporting farmers has been always been very low despite good policies that support farmers, very little is done to deliberate improve maize farming with reasonable subsidies that will ensure maize farm growth in rural areas. Farmers recommended that if the government can provide fertilizer, tractors and soft loan to farmers agriculture will improve. It is also concluded that the government must improve road infrastructure including bridges in rural areas to allow farmers transport their produce easily.

9.16.2 Recommendations

Tanzania is still a poor nation and capacity to feed its citizens through maize agricultural improvement is basic activity for poverty alleviation, employment and income among people where 80% of the workforce is engaged in agriculture. The study recommends the following

1. Gold Export to Account for Agricultural Innovation and Technology

- The government must use imported technology in agricultural innovation and technology for maize farm in Tanzania. 18% of gold export can be used to import modern technology and innovation in agriculture.
- Underground water has not been utilized in the areas visited where most of the agriculture is rain fed therefore government can use gold export to assist farmers with boreholes to utilize underground water for maize farming rather than rain fed agriculture which victim to climate change and its availability. This will make agriculture production throughout the year.
- Government must supply farmers with quality seeds and fertilizer that assure farmers with high level of output.
- Innovation must be done to improve yield per acre of maize production given the soil production infertility and advise farmers appropriately.

2. Gold Export to Account for More Subsidies

It is suggested that the government must prepare for the big push with subsidies to support growth of maize in the area.Goverment has the capability to subsidize farmers on strategic areas of their agriculture inputs including bore holes, water reserve tank for irrigation,fertilizer,pesticides ,irrigation equipments etc. The government must abolish taxes on all agricultural inputs imported from abroad but increase taxes on gold export or revenue.

3. Gold Export to Account for Dam Construction and Rain water harvesting

This can be a good strategy for the government to construct dams and harvest rain water in the villages. Some amount of gold export should be set aside to finance for the construction of dams for water harvesting in the area and irrigation in the area.

4. Gold Export to Account for Rural Infrastructure

Given the gold deposit and export the government can improve infrastructure in rural areas thereby making it passable throughout the season.This must be done before gold is depleted.

5. Gold Export to Account for Tractor in each Village

Provision of Tractors and other machines necessary to carry out maize production must be provided by the government to enhance productivity of maize in the area. The government must use gold export to buy tractors and other machines for rural farmers in each village before the gold is depleted.

6. Education on agriculture commercialsation,marketing and entrepreneurship

Special seminars and training to farmers on commercial agriculture must be promote and facilited by the government officers.Timely market information to farmers must be provided through appropriety channels in the country.

7. Provide soft loan to farmers

The government must guarantee farmers with soft loan from commercial banks to allow farmers buy necessary inputs for agricultural development in the area.

CHAPTER TEN

THE NATIONAL DIALOGUE ON GOLD EXPORT IN TANZANIA

This chapter observed the national dialogue on gold production and export of the Gold concentrate that were officially lounged by the president of united republic of Tanzania who formed the committee that probed for gold production and export of Gold concentrate on 29th March 2017 for the first committees and 10th April 2017 for the second committees. The composition of the team is people from different background including economist, geologist, chemistry and legal experts. The team was given a role to examine the quantity and value of gold concentrate by the multinational companies exporting the gold concentrate abroad. The committees also investigated whether the gold concentrate for export has no other types of minerals on it. The presidential committees gathered facts regarding gold concentrate and documentation from companies with containers to the point of port in Dar es Salaam for export. The committee worked on the containers by picking the sample in each container with gold concentrate The researcher drew a lesson on it and facts presented during the May 2017 has also helped the researcher of this study to validate his findings that gold is significant for our economy in Tanzania as also declared by the presidential appointed committee on May 2017.

The researcher used radio, television and printed papers some are online in Tanzania to validate on gold concentrate by the multinational covering the period March to July 2017 also the presentation by probing committee on gold concentrate. The researcher examined the discussion and conclusions that were extracted from the experts and the president of United Republic of Tanzania with a special focus on ACACIA company that dominate the export of gold concentrate.

10.1 Outcome of Expert Committee Discussion

The committees inspected 277 containers with gold concetrate in Dar es salaam and other containers were in Bulyankulu and Buzwagi in shinyanga ready to export in 2017 only.It was revealed by the committes that that the gold concentrate and value is not known to the government with exact amount and quantity of gold in each container exported abroad the committee reported. The condition portray picture that gold is being looted from Tanzania and the government is losing revenues that could be available for development.

The committees went further to investigate on the type of minerals available in each container to speculate whether there is more gold and other minerals and less is declared at the port in dar es salaam.It was discovered that there were between 671-2373 grams per tonnes in each container declared gold concetrate(sand) with average of 1400 grams per tonne. This is equivalent to 28 kilogrammes(Kg) of gold for 20 feet container of 20 tonnes of gold concentrate. Therefore with 277 of gold concentrate occupy 7.8 tonnes of gold with a value of Tsh 674 billion and this was the minimum estimate but with maximum estimate is that one container with gold concentrate of 20ft was having a value of 47.5 kg of gold concentrate in each container and this was equivalent to 13,157.3 kilogramme (this is equivalent to Tanzania shillings 1.146 trillion).

Findings from Companies and agents exporting gold concentrate including the government agency (TMAA) declared less value of gold concentrate and declared 200grams per tons equivalent to 4 kilogrammes in each container and therefore with 277 containers at the port will be having a total of 1.2 tons of gold with a value of Tsh 27 billion.

It is observed from the report that even the government agency was involved in declaring less gold value of gold in each container and making the government with less money available for development including the agriculture sector.

The committees also found there was other types of mineral under the same containers that includes copper, silver, Iron ole and other strategic metals etc all these were not reported properly in the books by the agency exporting the gold concentrate. But for the purpose of this study focus on the analysis of gold export.

There was a great concern by the committees to see that gold concentrate is exported abroad and the government is losing a lot of finance and they recommended that the government should immediately ban on the export of gold concentrate and all gold concentrates should be processed locally and when exported the metal expert must be consulted.

In his remarks also the president of Tanzania said that these companies also export between 250 containers to 300 plus of containers with gold concentrate and total annual gold concentrate being exported is around 3600 containers so you can imagine how much the government is losing is quite significant amount president pointed. The president said these companies have been playing this game since 1998.He requested Tanzania to be united on this since we are losing. Gold is money. He added that Tanzanians to work for their nation and be accountable on valuating gold properly because these companies tend to undervalue the gold amount.

The second report committees appointed by the president also vsited key mining companies that includes Bulyankulu gold mines Ltd, pangea gold mine ltd,North mara gold mine ltd Geita gold mine ltd. The committee also visited the port authority in Dar es salaam to examine how gold concentrate is weighed in a scale for export, Tanzania revenue authority, ministry of energy and mineral, the government agency TMAA and the stock market.

It was discovered by the committee that gold concentrate is being exported to China Japan and Germany at its raw gold and exported with the aim that is going to be processed to those countries. There are several foreign business companies that deals with gold concentrates none of the local company is involved with key port in Tanga and Dar es salaam used as a way to export gold concentrates.

The committees discovered the involvement of the staffs from government and gold mining companies, business companies and TMAA have committed error and shame against government. Apart from gold also committees discovered other mineral including uranium. The total value of gold concentrate in 20ft containers exported from 1998 to 2017 is around Tsh 68.59Trillion.The committee said this amount lost is similar to two years National budget of 2017/2018.The government has lost the opportunity that could have been used to finance development programmes.

President again remarkably said that the issue of poverty is a choice among ourselves. We have poor health and hospitals, farmers lack agricultural input, we lack safe water ,poor infrastructure we also secure loan from other countries with high interest rate because some companies and individuals steal our gold resources. The president question on the leadership in Tanzania to examine the real value of minerals includes gold.

The president was bitter to question accountability of the government agency and the board and dissolve the board and chief executive of the TMAA was requested to stop working with the government agency and he must be investigated as well as staffs should also be investigated. The president added that the security organ and institutions must be involved at this time to detect the real value of our gold. The president also demanded accountability on the ministry concerned with minerals and he insisted that they all be assessed including the commissioners. He also requested the minister concerned with the ministry to resign.

Following the president report on gold concentrates a special agents had to travel from USA and Canada on hired special plan to come and make negotiations regarding Gold Concentrate for export while people in Tanzania starve. The convoy from the ACACIA team was people of high profile visited in Tanzania and talked with the president secretly. ACACIA company is believed to be master mind company behind gold export concentrate harvesting larger amount

of gold export revenue as president stated and leaving to the domestic economy with only 3% and taking out 97%.

This is not the only company but is among the giant gold producer in Tanzania. Several issues were discovered not only for gold but also diamond being looted. Local news reported and international report like Fumbuka N(2017) who reported on Reuters that diamond worth USA $ 29.5 million that was undervalued by a UK, London listed Petra Diamond at the port of Dar es Salaam confiscated by the government of Tanzania following special investigation. This amount alone can supply tractors in every village in Tanzania.

This demonstrate that there is a lot of hidden games played by the multinational companies who enjoy the maximum revenue at the ignorance of gold resources among professional and other experts in the country.

10: 2 Conclusion and Recommendation

10.2.1 Conclusion

Based on this observation from the government and the president it is a high time for Tanzania to put value on their Gold resources and other related stock of resources. There is a lot of funding through gold and its related resources that if well mapped can help transform Tanzania especially when the mapped resources shall be used to improve the agriculture sector. Multinational companies from UK, Canada, and USA etc should also support development in the country by making sure larger proportion of gold revenue must be utilized locally since they are excluded from taxes like Value Added Tax. The games of enjoying people ignorance on gold export and concentrates should end. Government officials and local companies must work hard to promote accountability to the nation.

10.2.2 Recommendations

Contract with Multinationals companies

All contract signed previously with the government must once again be reviewed to reflect value on the local economy. Multinational companies must declare the

real value of the gold export at the point of taking it to the market and to the larger extent must show the real market value and price of their gold export.

Gold Export Tax

In order to maximize the granger causality and cointegration Gold export tax should be introduced since the value of gold is high and stable than the local currency and the USA $, the government should enjoy the maximum revenue and producers will be willing to pay since currently there is no Value Added Tax on gold export revenue. The initial export tax should start at 18% this should be in year one.

Local Gold Miners

Government must support local small miners with technology and skills on gold exploitation and export since Tanzania is among the country with large deposit of Gold in Africa and the gold pricing is stable and promising in the world market.

Transparency and Accountability

International companies (the gold companies), government officials and agents must increase transparency and accountability on gold value, pricing and export. The more transparency the more government is left with more money and revenue.

CHAPTER ELEVEN

CONCLUSION AND RECOMMENDATION

11.1 CONCLUSION

The main methodology used both qualitative and quantitative descriptive research. The main reason of using these two approach was to get more investigative analysis and details based on the role of Gold export in agricultural development and poverty alleviation in Tanzania. The nature of the problem is complex therefore in order to derive the problem and understand it require different methodologies and approaches to be well to informants.

Secondary data with time series covering the period of 24 years from 1990 to 2014 were used to a larger extent to validate the study and support analysis under scientific approach. Granger causality relationship was observed during the study period for the named variables. In testing for granger causality, the first step in this study is that, data were tested for stationarity and for this case variables were differentiated to examine the stationarity properties. The Augmented Dickey Fuller (ADF) was applied to perform a unit root test. The researcher applied hypotheses to guide the study when testing for unit root to examine the validity of the variables in the proposed model. Long run and short run causality was also determined among variables under estimation through vector error correction model.

The researcher investigated the key variables that are gold production and export, gold price, economic growth and agricultural productivity poverty alleviation rate and the status of farming investment. The study has come up with new theory for agriculture productivity push in Tanzania through gold export tax revenue.

It was again discovered by the researcher through causality relationships, that gold export plays a significant role in the agriculture productivity in Tanzania if well mapped out. This is evidenced from the findings that gold export granger cause agricultural productivity and growth. Also cointegration between gold export and agricultural productivity (at 5 lags). Also in the short run and long run

gold export has causality impact on agriculture productivity vector error correction model (VECM) validate this. The more gold we export the more agricultural productivity is expected to be realized for the future given the right policies for gold to account for agriculture productivity. It was revealed in the study that gold production for export granger causes poverty alleviation and poverty alleviation also granger cause gold production for export at lag six. It was also revealed that there is cointegration between the variables. Short run and long run exist also VECM validate the findings that calls for more gold production and export in Tanzania.

Furthermore based on the granger causality Wald test results the probability value and the level of significance at 5% the researcher found that there is granger causality moving from Gold Production Growth Rate (DGOLDPDGR) to Gross Domestic Product Annual Growth Rate (DGDPR).Likewise there is granger causality moving from Gross Domestic Product Annual Growth Rate to Gold Production Growth Rate. The researcher concluded that great care regarding policies and other implications should be formulated for better results of Gold Production Growth Rate (DGOLDPDGR) in enhancing Gross Domestic Product Annual Growth Rate (DGDPR). The study reveals also that there is cointegration among the variables Gross Domestic Product Growth Rate and Gold Production Growth Rate. The study found there is short run causality running from Gold Production Growth Rate (L1, L2, L3, L4, L5, L6) to Gross Domestic Product Growth Rate.

It was revealed from the findings that agricultural development plays a significance roles in promoting the domestic economy in the country given the time series data 1990 to 2014 at 6 lag. Tested variables found that Lagged(6) agricultural growth(agric) causes economic growth(Grt) economic growth granger cause agricultural growth(agric) therefore it is significant to consider the right formulation of policies in the economy to given the granger causality and cointegration and that these variables move together in the long run.

As said earlier on the qualitative approach researcher used questionnaires, interview and discussions in order to get data on primary sources information for

the period of September 2015 to March 2016. Self-administered questionnaires were designed to seek views, opinions, and relevant data from the respondents in respect to the objectives of the study. The questionnaires were simple with the kind of questions in which, respondents had wide freedom of choice to express view. Formal and informal Interviews were also carried out in order to get a general picture and views about issues under investigation. Interviews were conducted as a way of supplementing the data which were generated through questionnaires. Observation method was used by the researcher to physically observe the field situation on issue under survey. In some cases group discussions were applied by the researcher to discuss issues under this survey followed by a final meeting that was held at Bargish Ants-Mbulu district in Manyara region. This assisted the researcher to gain understanding and first hand data on issues related to the role of gold export in agricultural development and poverty alleviation in Tanzania.

Based on the primary data it reveals that despite the difficult living condition of individual farmers in the areas of Arusha- Karatu District (Mbulumbulu ward the village of Kambi ya Simba), Manyara -Mbulu District in the village of Bargish antsi and Moringa –Daudi ward farmers still believe that agriculture is the main activities that if supported by the government it can assist in reducing poverty among majority. It is observed that the contribution from the government has been very low as compared to the agricultural potential in the area. Poor quality of seeds, lower level of technology and education has been among the contributing factor for poor agricultural output in the areas and sustainability of the farm investment. Lower output per acre of production was observed to be the major problem among respondents in the areas visited. Regarding farm profitability and returns for all villages it reveals that there is bad returns when assessing the level of profit on farm investment mainly the maize production and therefore there is no sustainability.

Cost and benefits analysis was applied for quantitative data generation and policy decision regarding farm investment viability and constraints. A video tape was also captured with a documentary pictures showing the role of gold export for

agricultural development and poverty alleviation in Tanzania to be well informed to informants.

Tanzania has failed to capture gold export for agricultural development in the country starting from the year 1990 to 2014 see the lost opportunity from gold export that could have been captured to push development in the country especially in agriculture. The amount could have transformed agriculture and make sure that every village has tractors and other agricultural inputs to support farm agricultural development hence increasing the output and alleviating poverty. The lost opportunity is also revealed in Tanzania agriculture food security and investment plan(TAFSIP) they had a clear vision to uplift the agriculture sector but it fell short of financing during the named period with a total financing gap amounting to US $ 2877Million required to improve the sector. In 2012 alone only US $ 269 million was required, 2013 was US $ 524 million, 2014 was US $ 596 million was required. Gold export could have accounted for all these.

Future Trend suggest Gold Export 2015-2030 that gold export is positively increasing based on research projection from the year 2015 to 2030. This positive increase of gold production and export should be realized in agriculture productivity through export tax push revenue.

This study discovered that the significance of Gold is much known to multinationals that enjoy lower taxes and take out of the country more than 97% of total gold export and leaves only 3% to the domestic economy.

11.2 POLICY RECOMMENDATIONS AND STRATEGY

The study recommend the following key issues to be undertaken to enhance agriculture productivity for poverty alleviation in the country through gold export;

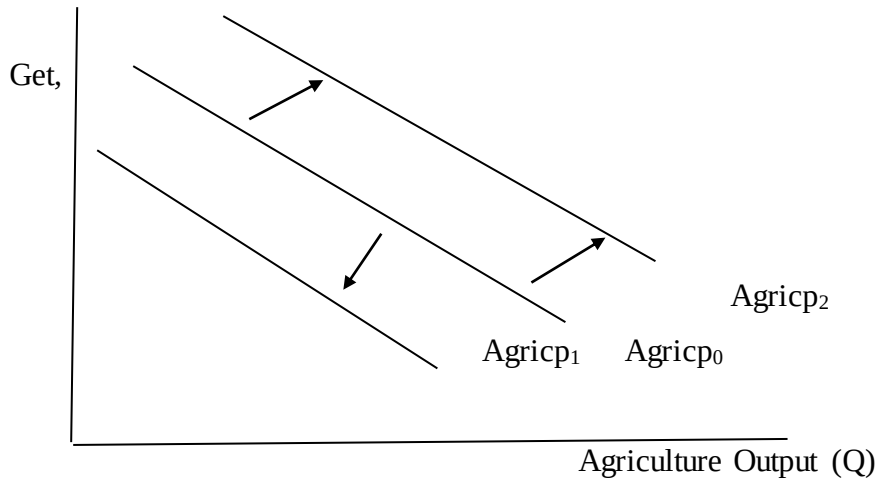
1. Prioritizing Agriculture

The government must prioritize agriculture through increased support from the government with different programmes since agriculture has direct impact in alleviating poverty. Farmers still believe that agriculture is the main activities that if supported by the government it can assist in alleviating poverty among majority. Again there no way Tanzania can develop without a focus on agriculture productivity.

2. Gold Export Tax Push On Agriculture Productivity

Gold export tax push should be introduced since the value of gold is high and stable value than the local currency and the USA $, the government should enjoy the maximum revenue without doubt. Gold tax push on gold revenue for agriculture push should be introduced at the initial stage of this recommendation. The proposed gold tax push is expected to push the agriculture sector to the right at $Agric_2$ from the initial of $Agricp_0$ and help alleviate poverty in the country.

Gold Export Tax Push on Agriculture Productivity

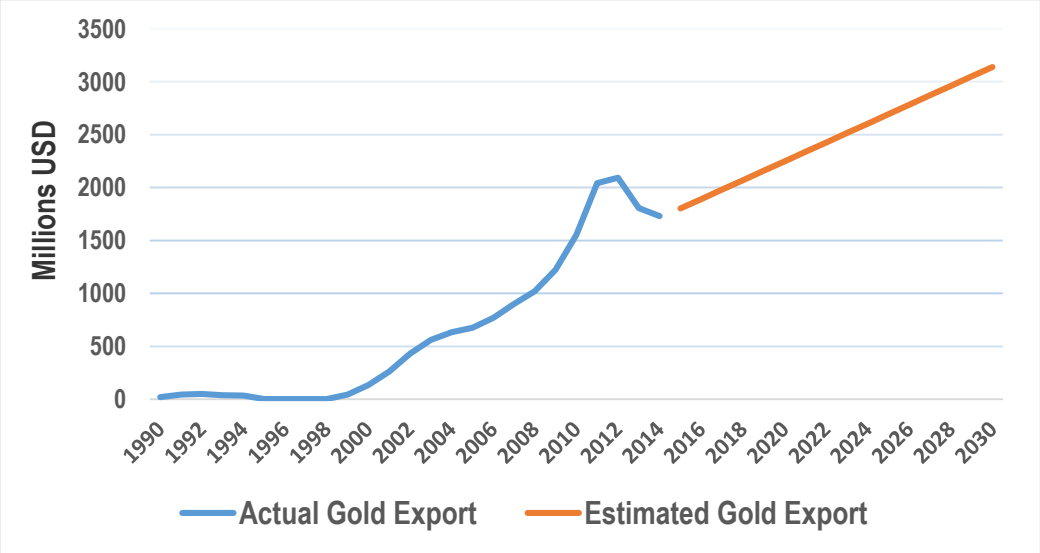


Gold companies will be willing to pay taxes given the stability of Gold to the world market and to the assumption that currently gold producers and sellers do not pay Value Added Tax so introducing the export tax will be the best strategy for Tanzania to alleviate poverty through using part of this revenue for

agricultural development given the gold export tax push. The country will be self-sufficient with food and reduced hunger among citizens.

The researcher also suggest to the government to focus on the future trend for gold export that they should adopt this policy since Tanzania has a larger stock of gold and production and currently there is less benefit to the domestic economy.

Tanzania Actual Gold Export 1990-2014 and Future Trend Gold Export 2015-2030



The above figure shows Tanzania Actual Gold Export 1990-2014 and Future Trend Gold Export 2015-2030.It reveals that gold export is positively increasing based on this estimate from the year 2015 to 2030.Initally the amount in 2018 is expected to be US $ 2,069,065,147 when this amount is targeted for with gold export tax push, it can be a significant amount in setting farm investment. It is projected that these Gold revenue will keep on increasing and reaching a total revenue US $39,520,909,221 for all projected years. This positive increase of gold export should be realized in agriculture productivity through export tax push for agriculture in Tanzania. This annual amount when targeted could make revolution in agriculture in Tanzania while improving livelihood of the people, income and poverty alleviation in the country.

All revenue received from gold export tax push should be directed to mechanize agriculture in the country where majority of the people are in this sector about 80% with funding on the key areas:

- ✓ Providing farmers with modern farming tools, machines and tractors in every village where farmers reside
- ✓ The government must use imported technology in agricultural innovation and technology to improve agricultural out put
- ✓ Provide enough subsidies to farmers requiring support from the government including fertilizer
- ✓ Set up farm infrastructure including road and industries for farmer's value addition.
- ✓ Set up water harvest strategy, bore holes, water reserve strategy and irrigation that farming activities should be don the whole year round
- ✓ Government must supply farmers with quality seeds and fertilizer that assure farmers with high level of output.
- ✓ Special seminars and training to farmers on commercial agriculture must be promoted and facilited by the government officers.Timely market information to farmers must be provided through appropriety channels in the country.Training on profitable farming should be enhanced.Farmers must be trained on how to keep log book of maize farm cost and revenues for each year.

3. Understanding the Value of Gold

Introduce special curricular in primary schools, secondary schools, universities and other vocational trainings on gold exploitation process, gold value, quality and market for gold and other gold related metal in the Tanzania.

4. Tax Officials

Tax officials must be empowered to detect raw gold export values also gold export in the form of bars and ensure local people benefit more than the multinational companies who currently enjoy maximum revenue on gold export.

5. The Multinationals companies exporting gold

The involvement of multinational companies in gold production and export who pays 3% to the government and take 97% must be limited and those involved in gold export should not be given tax exemptions. The current Gold companies and their tax system must be reversed and make sure that large proportions of gold export income remain domestically to improve GDP in Tanzania through improving the agriculture sector.

The government must review gold mining policies and contracts with multinational companies involved in gold to reflect gold export tax push on agricultural productivity concern in Tanzania. In some cases the government must have great share on key gold mining companies that produce and export gold in large quantities.

6. Local Gold Miners

Government must support local small miners with technology and skills on gold production and export since Tanzania is among the country with large deposit of Gold in Africa and the gold pricing is stable and promising in the world market. Local people must dominate gold export in order to realize larger impact of GDP. Therefore the government must empower local people with special funding to enable local people to exploit gold. Also the government must assist local gold miners with gold processing industries and ensure larger percentage of Gold Produce locally must be processed locally for value chain purposes and more job opportunities only final product should be exported.

7. The Central Bank of Tanzania

The central bank must make sure that the gold revenue to a large extent must reside in the country to help stimulate the domestic economy. Gold export value can be used to supply the nation with technological needs especially technology to support agriculture. Gold export can be used to protect the country during the economic crisis and stabilizing the economy through stable currency unlike today where there is no link to gold export and the level of economic growth. Gold is

money by itself and therefore clear strategy is required on how to use gold for development.

The government through the central bank should know that value of gold is always stable that is why countries keep reserve of gold and Tanzania must apply appropriate policies that will benefit the domestic economy with multiplier effect and the gold stock should be accounted reserve in the country and there no need to set policies that will extract gold at the expense of the domestic economy like the prevailing policies.

8. Increasing Accountability among government, individuals and giant firms involved in the gold export

Giant firms involved in the exploitation of Gold in Tanzania and Africa must increase responsibility, accountability and transparency on gold production, gold export and tax deals, incentives by the government to giant firms must be avoided and that more money gained from sales of Gold export and other natural resources to a large extent must be ploughed back to domestic economy before its depletion point and bring about development in the country.

9. Tanzania Gold Market Exchange

Stimulate local gold demand through establishing Tanzania Gold Market Exchange where people can be freely trade locally produced gold that can also provide an opportunities for future gold trading and employment in Tanzania.

11.3 New areas for further research includes;

- Operation of commodity market (gold and other important metals) in Tanzania
- The structural equation model using path analysis can be carried out for further study
- Appropriate tax rate to gold producing companies must be carries out.

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APPENDICES

Appendix -1

Gold Export Contribution to GDP at Market Price From 1990-2014

Year	Get in US $	GDP at Current US$	Get Contribution To GDP
1990	20257937.8	4258742899	0.48
1991	44708902.71	4956588279	0.90
1992	50018503.83	4601413264	1.09
1993	38979460.54	4257702197	0.92
1994	35320761.6	4510846968	0.78
1995	3952340.96	5255221425	0.08
1996	3933773.049	6496195451	0.06
1997	2468713.624	7683852497	0.03
1998	4039341.432	9345174219	0.04
1999	43843700.88	9697847264	0.45
2000	135139200.7	10185786383	1.33
2001	262184906.4	10383560603	2.53
2002	431372740.7	10805599893	3.99
2003	560978304	11659129889	4.81
2004	634598263.6	12825801581	4.95
2005	675884942.6	16929976600	3.99
2006	771199250.3	18610460327	4.14
2007	898586400.2	21501741757	4.18
2008	1021314481	27368386358	3.73
2009	1222713546	28573777052	4.28
2010	1553014091	31407908612	4.94
2011	2040679224	33878631649	6.02
2012	2093294465	39087748240	5.36
2013	1804633295	44384603620	4.07
2014	1729807293	48056680982	3.60

Appendix 2 Predicted Gold Export Troy's Produced 1980-2015

Year	Price in US $	Gold production(KG)	1kg=32.15Troys	Troy's Produced
1980	612.56	3	32.15	96
1981	460.03	9	32.15	289
1982	375.67	7	32.15	225
1983	424.35	24	32.15	772
1984	360.48	39	32.15	1254
1985	317.26	55	32.15	1768
1986	367.66	85	32.15	2733
1987	446.94	201	32.15	6462
1988	436.94	164	32.15	5273
1989	381.44	112	32.15	3601
1990	383.51	1643	32.15	52822
1991	361.11	3851	32.15	123810
1992	343.82	4525	32.15	145479
1993	359.77	3370	32.15	108346
1994	384	2861	32.15	91981
1995	384.17	320	32.15	10288
1996	384.77	318	32.15	10224
1997	330.98	232	32.15	7459
1998	294.24	427	32.15	13728
1999	278.88	4890	32.15	157214
2000	279.11	15060	32.15	484179
2001	271.04	30088	32.15	967329
2002	309.73	43320	32.15	1392738
2003	363.38	48018	32.15	1543779
2004	409.72	48176	32.15	1548858
2005	444.74	47270	32.15	1519731
2006	603.46	39750	32.15	1277963
2007	695.39	40193	32.15	1292205
2008	871.91	36434	32.15	1171353
2009	972.35	39113	32.15	1257483
2010	1224.53	39448	32.15	1268253
2011	1571.52	40390	32.15	1298539
2012	1668.98	39012	32.15	1254236
2013	1411.23	39,775	32.15	1278766
2014	1266.4	42,486	32.15	1365925
2015	1160	42465	32.15	1365250

Appendix 3 Gold Export and GDP Growth Rate 1980 - 2015

Year	Predicted Gold Export Value in USD	GDP Growth Rate
1980	59081	3
1981	133110	-0.5
1982	84545	0.6
1983	327428	-2.4
1984	451988	3.4
1985	560995	4.6
1986	1004723	1.9
1987	2888193	4.9
1988	2303810	4.4
1989	1373489	2.2
1990	20257938	6.2
1991	44708903	2.8
1992	50018504	1.8
1993	38979461	0.4
1994	35320762	1.4
1995	3952341	3.7
1996	3933773	4.2
1997	2468714	3.3
1998	4039341	4
1999	43843701	4.8
2000	135139201	4.9
2001	262184906	6
2002	431372741	7.2
2003	560978304	6.9
2004	634598264	7.8
2005	675884943	7.4
2006	771199250	6.7
2007	898586400	7.1
2008	1021314481	7.4
2009	1222713546	6
2010	1553014091	7
2011	2040679224	6.4
2012	2093294465	6.9
2013	1804633295	7
2014	1729807293	7
2015	1583689710	7

Appendix 4 Variable of Interest at their First Difference From 1990-2014

Years	DGr t	DGetRate	DAgric	DPVRATE
1990	0	0	0	0
1991	-3.4	156.975	0.38	19.27995
1992	-1	369.6	-0.11	-22.855281
1993	-1.4	-126.6	-0.15	-0.2748268
1994	1	37.2	-0.03	13.114649
1995	2.3	-127.4	0.41	10.453204
1996	0.5	-237.9	0.57	7.1596606
1997	-0.9	-59.3	0.41	-4.9962761
1998	0.7	-0.3	-0.33	3.3575803
1999	0.8	162.4	0.17	-17.406188
2000	0.1	-53	0.08	1.1512206
2001	1.1	6.4	-0.01	-3.0914263
2002	1.2	149.7	0.09	1.9988461
2003	-0.3	213	0.26	3.6528622
2004	0.9	201.5	0.44	1.9715957
2005	-0.4	156.8	0.87	21.273078
2006	-0.7	97	0.56	-21.49955
2007	0.4	-10.9	0.37	5.3706031
2008	0.3	149.1	2.11	11.340301
2009	-1.4	238	0.76	-22.179391
2010	1	51.2	0.75	5.3532281
2011	-0.6	-56.9	0.55	-1.9705042
2012	0.5	26.4	2.21	7.2937305
2013	0.1	-40.9	1.69	-1.8810829
2014	0.0	-31.7	0.05	-4.5519051

Appendix 5 Survey Photographs

Farmers Toilet Despite Gold Stock and Export

Researcher during the Survey

Farmers General Condition and Housing Structure

Farmers childern at home

Common Transport in Rural areas

Hand Hoe Farming Technology Dominates among Farmers

Appendix 6 Farmers Survey Questionnaires

These questionnaires aims at capturing information on the role of Gold export for agricultural development and poverty alleviation in Tanzania. The information you will provide in this questionnaire shall provide the way to improve agriculture development and poverty alleviation and any information provided shall be kept confidential.

SECTION ONE : FARMERS
(Tick as appropriate)

1. Tick in the space about your gender Male (M)……../Female (F)……..
2. Do you have any maize farm?
   Yes……
   No……..
3. If yes in question two above mention how many acres do you own in a year for maize farming
   ……
   ……
   ……
   ……
   ……
4. Maize farm investment is very sustainable nowadays.
   a) Agree b) disagree
5. How would you describe maize farm profitability? (cycle one please)
   a) Very good returns b) Good returns c) Moderate returns d) Bad returns e) Very bad returns
6. What is the level of your education? (cycle one please)
   a) Non b) Primary School d) Secondary School d) Diploma/ certificate e) Degree f) Masters
7. What level of technology applied in maize farm?
   a) Hand hoe b) Oxen c) Tractors d) other please specify……..
8. What are the main cost of production for running a farm investment ? (Use separate sheet attached to fill production cost of maize farm investment)

13. What are the average revenues received from maize farm investment project per year

a) TZS 1 million to 5million
b)TZS 8 million to 25 million
c) TZS Above 25 million
e) less than 1 million

14. How is your maize output level in achieving your targets?
    a) Very good
    b) Good
    c) Poor
    d) Very Poor

15 Mention at least three major problems hindering the growth of maize farm investment in your area

……
……
……
……
……
……..

18 Do government support farmers through giving farm subsidies? (Please tick one below)

a) Yes……

b) No……..

If yes how Much is given as a subsidies to support your maize farm ?

a) Between 10,000 to 50,000/=
b) Between 100,000 to 500,000
c) Above 1 million
d) Non

20. Specify any other support from the government

……
……
……
……
……

21. What is the current level of your farm investment output per acre in bags per one season of maize?

a) 1 bags to 10 bags
b) 11 to 20 bags
c) 21 to 30 bags
e) greater than 30 bags

22.What should be the role of the government in promoting maize farm investment?

a) Provide soft loan to farmers

b) Provide subsidies like fertilizer and tractors and other technical inputs to carry out maize production

c)Provide both a) and b)

23.Rate the significance of agriculture in poverty alleviation

a) Excellent investment b) Very good investment c) Good investment d) Poor investment

SECTION TWO : COST AND BENEFITS TO BE FILLED BY FARMERS

Fill in the following table below showing the main production cost, price and revenue for running a maize farm per Acre

Table :Production Trend, Price and Revenue

Years	Bags of maize in 100kg	Estimated average price	Revenue
2009			
2010			
2011			
2012			
2013			
2014			

TABLE ; COST SHEET TO INDIVIDUAL FARMERS FOR ONE ACRE OF PRODUCTION

Total Cost	Amount Per acre of maize investment
Labor cost	
Fertilizers	
Seeds	
Planting	
Land clearing,	
Guarding	
Pesticides	
Cultivation	
Weeding	
Storage cost	
Oxen cost	
marketing cost	
transport	
Interest rate from bank	
Rent	
Taxes paid	
Communication	
Electricity	
Other expenses	

Mention the maize production trend for the past five years

Years	Bags of maize in 100kg	Estimated average price	Revenue
2009			
2010			
2011			
2012			
2013			
2014			

Thanks for your good response

Date and stamp

SECTION THREE: GOVERNMENT OFFICERS AND MINISTRIES

1. Name of the ministry……..
2. Write in the space about gender in numbers Male (M)……Female (F)…….

3. Your department…….

3. How do you view the agriculture sector growth in Tanzania
   a) Good
   b) Poor
   c) Very Poor
   d) Very good

4. How does government support maize farm?
   a) Through farm technology, tools and machines
   b) Seed and fertilizer
   c) Non
   d) Education and training
   e) All A,B and D
5. State the contribution of the government in supporting maize farmers?
   a) Very goodl
   b) Good
   c) Moderate
   d) Very Poor

6. Suggest at least four solutions to account for maize production and growth in the area ;

……
……

……
……
……
……

7.Rate the significance of agriculture in poverty alleviation

a) Excellent b) Very good c) Good d) Poor

Thanks for your good response

Date and stamp

Appendix 7 Gold Survey Questionnaires

These questionnaires aims at capturing information about the Role of Gold export in agricultural development and poverty alleviation in Tanzania. The information you will provide in this questionnaire shall provide the way to improve agriculture and alleviate poverty in Tanzania and any information provided shall be confidential.

SECTION ONE :
(Tick as appropriate)
1.Tick in the space about your gender Male (M)……../Female (F)……..
2. Select the highest level of education you attained (cycle one please)
   a) PhD Degree b) Master's Degree C) Advanced Diploma/First Degree d) Diploma/certificates
   e) Secondary school Education F) Primary School education G) None
3. Do you know the value of Gold? (Tick appropriately)
   YES…….. NO……

4. If yes how did you learn about the value of Gold? (cycle One please)
   a) In a school b) through friends and relatives c) Listening through radio and newspapers
   d) special course on Gold
5. Can you explain the difference between gold and silver?
   YES……NO……
6.Have you ever seen gold produced from Tanzania?
   YES……NO……
7. Why many people do not know about the value of Gold (cycle One please)
a) Not included in the curriculum b) less awareness among educated people c) value is not known
8.Why there is much involvement of multinational companies on gold export? (cycle One please)
a) They know the market and value of gold b) unutilized gold deposit in Tanzania b) Poor mining Policies

9.Rate the following usefulness of gold to the economy (Tick in the space provided)

		Excellent	Very Good	Poorly	Very poorly
i)	Rate how Gold is utilized in the economy of Tanzania.				
ii)	Rate how gold benefit local people				
iii)	Rate how multinational benefit from gold exploitation				
iv)	Rate how Gold help reduce poverty in Tanzania				
v)	Rate the significance of Gold in poverty eradication				
vii)	Rate the usefulness of Tax officials in assessing the value of Gold				

10.Mention three challenges we are facing in Gold exploitation

……
……
……
……
……
…….

11. What should be the main strategies that could be used in Gold exploitation? Propose any three strategies

……
……
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……

12. How much is the current price of Gold per one gram today in your market?(cycle one)
a) Between 30,000 to 100,000 b) between 200,000 to 500,000 c) between 600,000 to 900,000 d) above one million e) I do not know
13. Where do you sell your Gold? Mention any three market
……
……
……
……
……
…….

14. Any recommendation please write
……
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……
……..

Mwaitete Cairo