QER TANZANIA

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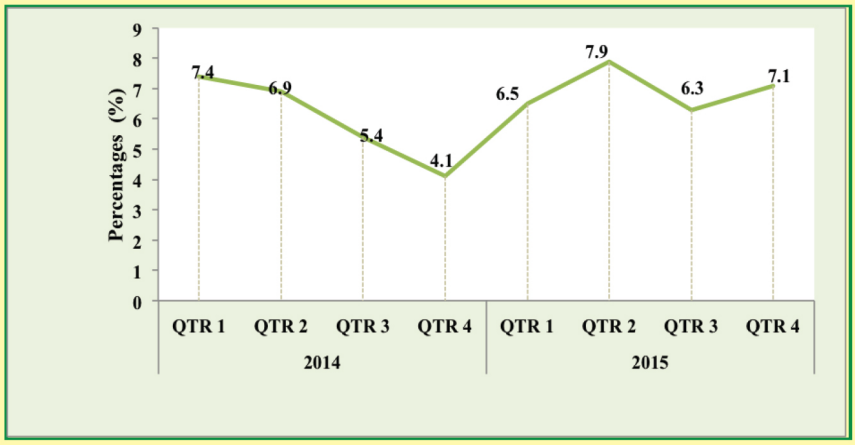
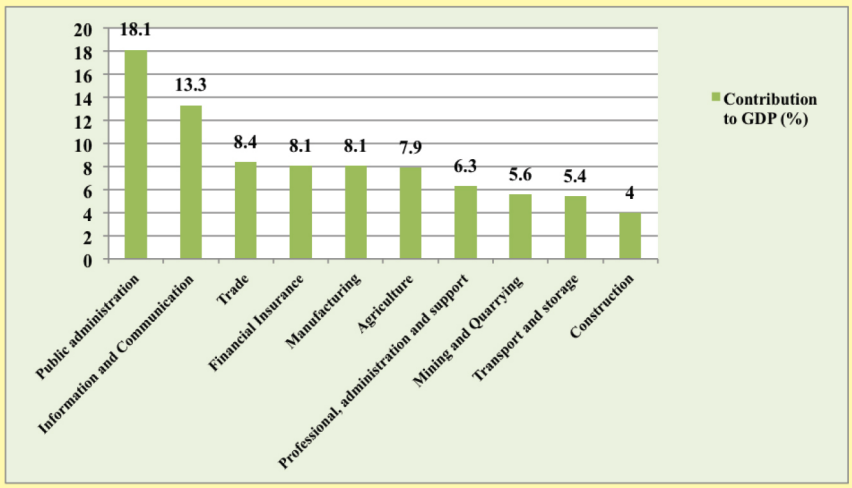
INSIDE

Quartely GDP Growth Rates



Source: National Bureau of Statistics(NBS)

Real GDP Contribution by Selected Economic Activities, Fourth Quarter, 2015



Source: National Bureau of Statistics (NBS) and Bank of Tanzania (BoT)

EDITORIAL NOTE

The current Quarterly Economic Review (QER) is the last issue of year 2015. It has followed the pattern of previous issues published in the year. It highlights key aspects related to the general economic performance and key macroeconomic indicators during the months of October, November and December.

During the year 2015, Tanzania's economic performance was generally encouraging. Real gross domestic Product (GDP) maintained the growth rate of 7 percent as recorded in the previous year. The attained growth was attributed to increased electricity production which in turn boosted industrial production; as well as higher growth in credit to private sector. However, although this growth rate puts Tanzania among African countries with high economic growth, it still lags behind the Tanzania Development Vision (TDV) 2025 goal of 8 percent GDP growth rate. The factors that have been contributing to this gap include challenges of use of outdated farming technologies, unreliable markets for agricultural products, unreliable rainfall in some regions and inadequacy of agro-processing industries.

Consumer price inflation in year 2015 averaged at 5.6 percent, less than the 6.1 percent inflation rate recorded in the previous year. The fall was mainly driven by collapse in oil prices in the world market since mid-2014 and proper implementation of the country's monetary and fiscal policies. Other macroeconomic indicators showed encouraging performance; high growth of credit to the private sector, good performance in collection of domestic government revenue, and increase in exports earnings.

The current QER carries two papers, namely, *"Financing options for implementation of the post-2015 agenda in Tanzania"* and *"Fish-farming value chain and policy analysis: Transformation for local markets, economic growth and poverty reduction in Tanzania"*. The first paper is inclined toward implementation of Sustainable Development Goals (SDGs) in Tanzania. It makes an analysis on ways in which financial resources can be most effectively mobilised and channelled and in combination with enabling policies and other means of implementation, to effectively support a transformative post-2015 agenda in Tanzania.

The second paper focuses on ways to transform Tanzania's fisheries sub-sector into sustainable commercial fishing, fish-pond farming, and processing for both domestic and foreign markets, and compliance to domestic and foreign market requirements while conserving the environment. It calls for government action to facilitate fish-farmers access and efficiently utilise financial services, technologies, and best management practices.

PART 1:

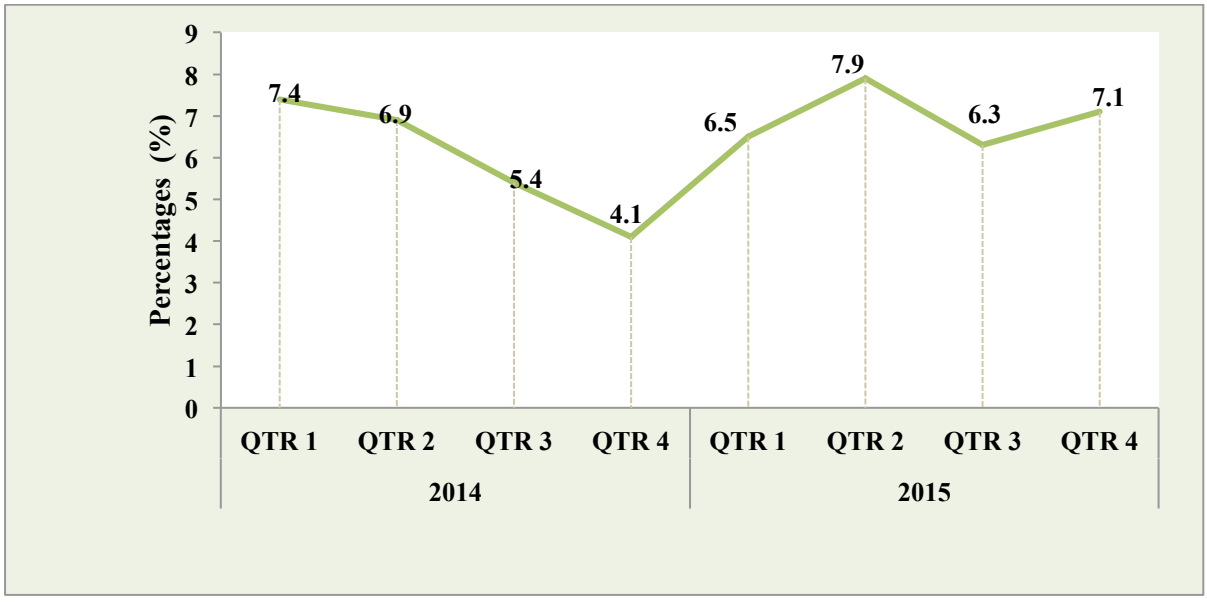
OVERALL ECONOMIC PERFORMANCE AND KEY MACRO-ECONOMIC INDICATORS

1. Overall Economic Growth

From October to December 2015, Tanzania's economic activities generated an aggregated Gross Domestic Product (GDP) of Tshs. 22.9 trillion, a real increase of 7.1% which is higher than the 6.3% growth rate attained during the previous quarter (July to September 2015) and 4.1% in the corresponding quarter during 2014 as shown in **Figure-1**. Consequently, GDP was 73% higher in the fourth quarter of 2015 compared to the corresponding quarter of 2014. The overall macroeconomic performance for 2015 remained strong with GDP averaging at about 7%, which is the same growth rate as that recorded in 2014.

This solid rate of growth was driven by (i) higher growth of loans to the private sector; (ii) ongoing infrastructure investments and expansion of telephone services and internet access; (iii) increased investment in the electricity sector which boosted production of manufactured goods; and (iv) the decline in global oil prices which has lowered overall production costs. The attained GDP growth was helped more by public administration (18.1 percent), information and communication (13.3 percent), wholesale and retail trade (8.4 percent) and manufacturing (8.1 percent) (**Chart-1**).

Figure-1: Quartely GDP Growth Rates

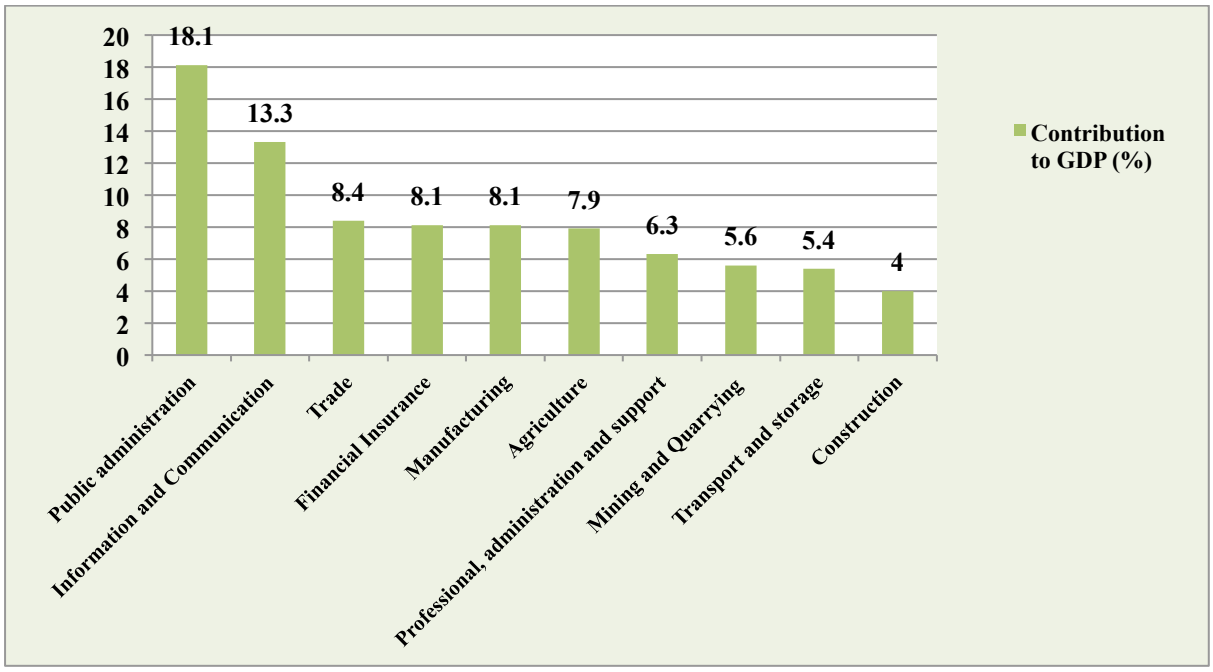


Source: National Bureau of Statistics(NBS)

High growth rates were indicated for information and communication (23%), public administration (19.7%), financial services (13.6%), and mining and quarrying (10.6%). The growth in information and communication was due

to increased use of mobile services and expansion of broadcasting and internet services in the country. Slowest growth was indicated for electricity and gas (0.1%), water supply (1.4%), accomodation and food services (1.7%), and agriculture (2.6%).

Chart-1: Real GDP Contribution by Selected Economic Activities, Fourth Quarter, 2015



Source: National Bureau of Statistics (NBS) and Bank of Tanzania (BoT)

2. Inflation Developments

In the fourth quarter ending December 2015, annual headline inflation slightly increased to 6.6%, compared to 6.3% in the third quarter **(Table-1)**. The speed of price increase was highest in December at 6.8%. The rise was mainly attributable to rising local food prices, especially rice and maize whose supply was low because of unfavourable weather conditions.

Movement of prices for key consumer groups in the consumer price indices from January to December 2015 shows that the index for food and non-alcoholic beverages had a rising trend contrary to the energy and fuels index which was negative during the second, third and fourh quarters of 2015. This reflected the fall in domestic fuel prices following the continued downward trend of petroleum products in the world market prices. The domestic petrol price cap for instance, was lowered by 7.8% from TZS 2,396 in September 2015 to TZS 2,208 in December 2015. The fall in energy prices has had a moderating effect on inflation.

Table 1:- Quarterly percentage changes in the National Consumer Price Index

Base: Sept 2010 = 100

		Quarterly average				
		2014	2015			
Main groups	Weight	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Food and non alcoholic beverages	47.8	6.6	5.2	8.6	10.1	10.9
Transport	9.5	1.2	-1.3	-1.7	2.6	1.2
Housing, water, electricity, gas and other fuel	9.2	10.0	5.0	1.2	4.8	4.4
Clothing and footwear	6.7	2.9	3.4	4.1	0.6	-0.2
Furnishing, housing equipment and maintenance	6.7	1.4	1.3	0.7	1.9	2.5
Restaurants and hotels	6.4	3.4	4.6	4.8	2.7	3.4
Alcohol and tobacco	3.3	5.4	5.4	5.5	0.3	0.2
Communication	2.1	0.6	0.6	0.4	-0.2	0.3
Education	1.7	5.1	1.9	3.4	2.0	3.2
Recreation and culture	1.3	0.7	0.5	0.9	3.3	3.3
Health	0.9	4.6	4.1	2.1	4.8	4.1
Miscellaneous goods and services	4.5	5.5	5.1	1.4	2.0	3.3
All items (headline)	100.0	5.5	4.1	5.3	6.3	6.6
Other selected groups						
Food and non-alcoholic beverages (combining food consumed at home and food consumed in restaurants)	51.0	6.5	5.4	8.5	10.0	10.6
Energy and fuels (combining electricity and other fuels for use at home with petrol and diesel)	5.7	10.0	2.1	-2.9	-0.8	-1.8
All items less food (non-food)	49.0	4.2	2.6	1.3	1.8	1.6
All items less food and energy	43.3	3.1	2.7	2.1	2.2	2.3

Source: National Bureau of Statistics and Bank of Tanzania calculations

Inflation Rates in Neighbouring Countries

A comparison of member countries in the East African Community (EAC) reveals that regional inflation has been increasing moderately during the second half of 2015 in all the five countries, due to high depreciation of local currencies against the US Dollar and low food production. By December 2015, Uganda recorded the highest inflation rate followed by Kenya and Tanzania at 9.3%, 8% and 6.8% respectively. Table-2 below puts Tanzania's recent inflation performance (annual percent change) in a regional perspective by comparing it to inflation figures of Kenya, Uganda, Rwanda and Burundi.

Table-2: Annual Headline Inflation Rates for countries in the East African Community in 2015

Country	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tanzania	4.0	4.2	4.3	4.5	5.3	6.1	6.4	6.4	6.1	6.3	6.6	6.8
Kenya	5.53	5.61	6.31	7.08	6.87	7.03	6.62	5.84	5.97	6.72	7.32	8.01
Uganda	1.3	1.4	1.90	3.60	4.90	4.90	5.4	4.80	7.2	8.8	9.1	9.30
Rwanda	1.4	0.7	0.8	0.9	2.2	2.8	2.3	3.0	3.7	2.9	4.8	4.5
Burundi	3.4	1.2	7.4	7.2	7.7	8.0	4.2	4.1	5.6	5.8	7.1	5.5

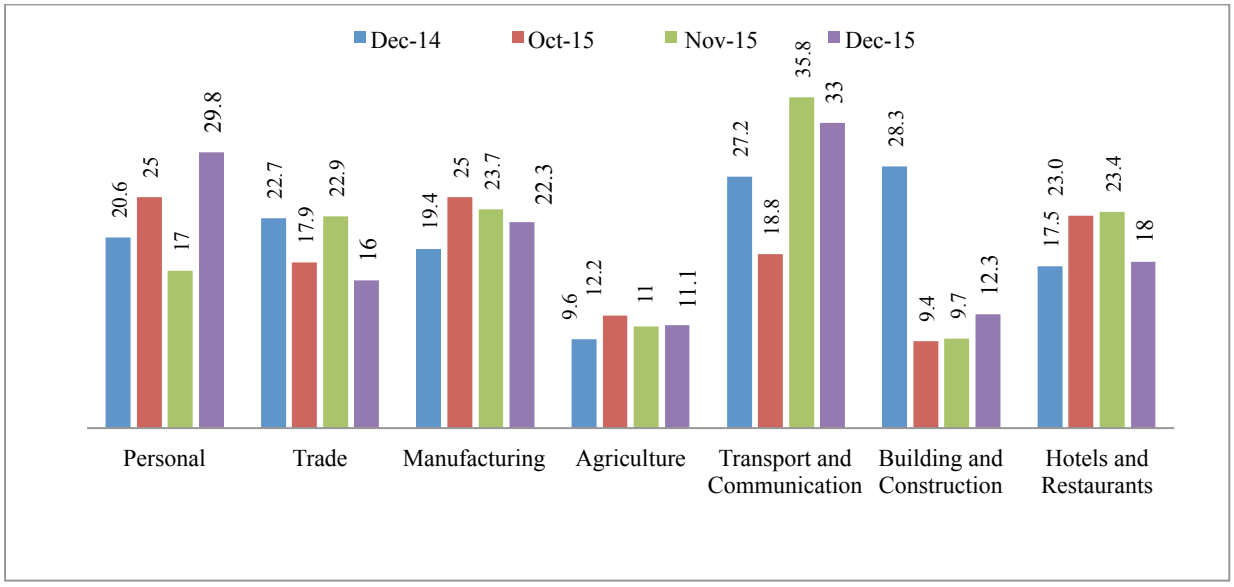
Sources: Central Banks of respective countries

3. Monetary and Financial Sector Developments

3.A Finance Credit

During the fourth quarter 2015, credit to the private sector registered high growth, supported by expansion of economic activities and moderation in the growth of net credit to the government. Credit to the private sector grew by 24.8% in the year ending December 2015 compared with 19.4 percent in the corresponding period of 2014. It was also slightly higher than in the preceding quarter which had grown by 24.7%. Credit was particularly strong in personal, transport and communication, and building and construction activities (**Chart-2**).

Chart-2: Annual Percentage Growth of Bank's Credit to Selected Major Economic Activities



Source: Bank of Tanzania

3.B Money Supply

Extended broad money supply (M3) grew by 18% during the fourth quarter of 2015, compared to the growth rate of 15.6% registered in the previous quarter. In a similar period, broad money supply (M2) grew by 17%, up from 12.6% in December 2014. The growth was largerly driven by an increase in the net foreign assets (NFA) of the banking system as well as credit to the private sector. The growth in the NFA was more pronounced in holdings of commercial banks, which increased by USD 234.1 million in the year ending December 2015 compared to a decrease of USD 147.2 million in the corresponding quarter in 2014.

3.C Interest Rates Development

Banks' lending and deposit rates exhibited a general rising trend. On average, the overall deposit rate rose slightly to 9.21% compared to 9.09% in the preceding quarter; and 8.32% in the corresponding period in 2014. With respect to the lending rate, it increased to 16.21% up from 16.12% in the quarter ending September 2015 and 15.91% in the quarter ending December 2014. The spread between lending and deposit rates narrowed on a 12- month basis to an average of 3.14% compared to 4.25% in the corresponding quarter in 2014.

3.D Financial Market Operations

In the quarter ending December 2015, Treasury bills worth TZS 811.0 billion were offered by the BOT, vis-a-vis a demand registered at TZS 1,035.49 billion, implying an oversubscription of 224.49 TZS bilion.The Bank decided to accept Treasury bills worth TZS 938.6 billion. The overall weighted average yield averaged 16.79 percent compared to 14.20 percent recorded in the quarter ending December 2014. Meanwhile, the bank offered Treasury bonds worth TZS 346.8 billion in the quarter ending December 2015 and demand was TZS 236.2 billion. Successful bids amounted to TZS 140.8 billion.

3.E Foreign Exchange Retail Market

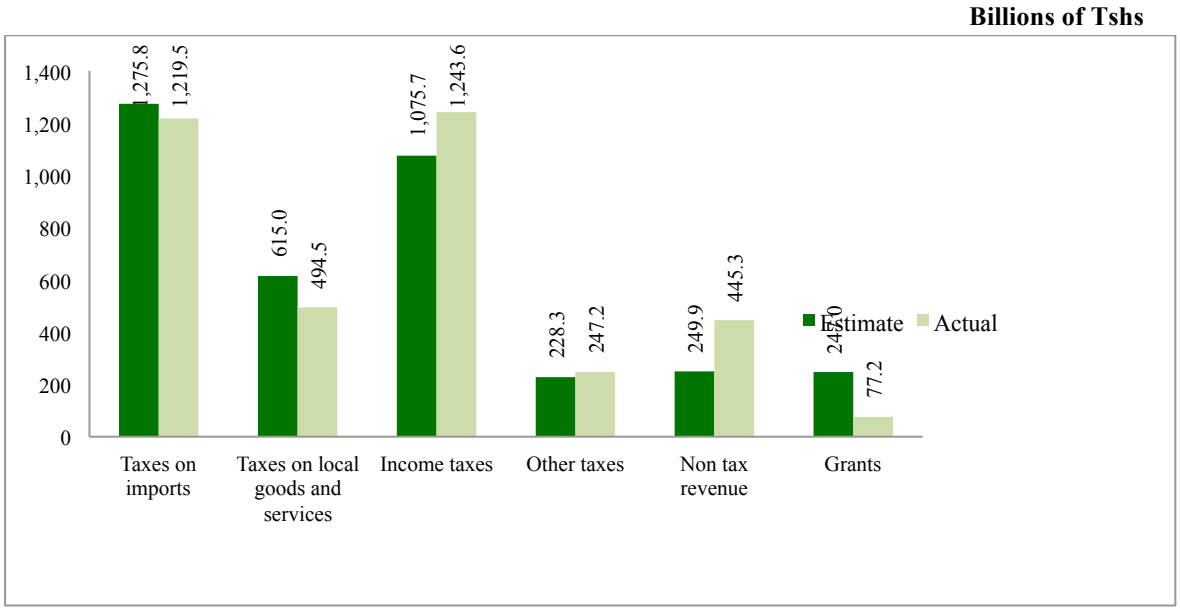
Foreign exchange transactions in the inter-bank foreign exchange market amounted to USD 564.5 million compared with USD 422.5 million traded in the corresponding quarter in 2014. Value of the shilling against the US dollar was generally as stable during the fourth quarter of 2015. The shilling traded against the US dollar at an average rate of TZS 2,180.1, TZS 2,157.6 and TZS 2,153.1 during months of October, November and December respectively.On average, the shilling was traded at a rate of TZS 2,163.57 per USD during the quarter ending December 2015 compared with TZS 1,706.32 per USD in the corresponding quarter of 2014.

3.F Public Finance

Government Budgetary Operations

Domestic revenue and grants obtained during the fourth quarter ending December 2015, were TZS 3,826.0 billion. Total expenditure during the same period amounted to TZS 4,683.0 billion. This implied a budget deficit of TZS 840.4 billion (after adjusting for cash) which was financed through both domestic and foreign sources. There was a generally good performance in collection of domestic government revenue, in all tax categories as indicated in **Chart-3**. Tax revenue amounted to TZS 3,204.8 billion and accounted for 85.5 percent of total revenue.

Chart-3: Government Resources, Fourth Quarter 2015



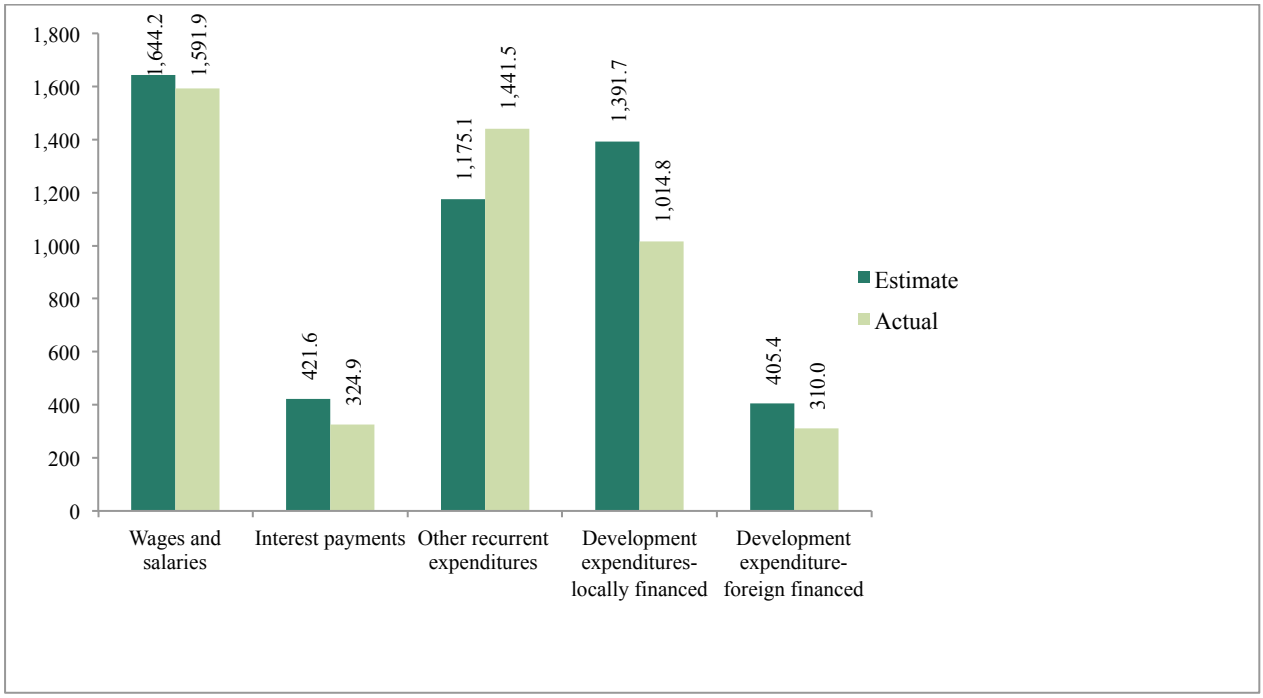
Source: Ministry of Finance and Planning and Bank of Tanzania

Foreign grants however did not perform well: disbursements during the reviewed quarter only amounted to TZS 77.2 billion against the projection of TZS 247.0 billion. Low disbursements were attributed to delays of funds disbursements by development partners. As a result, the country's development expenditure which mainly relies on foreign assistance was largely affected (**Chart-4**).

Expenditure for June to December 2015 amounted to TZS 4,683.0 billion or 93.0 percent of budget estimate, out of which recurrent expenditure was TZS 3,358.2 billion and development expenditure was TZS 1,324.8 billion, equivalent to 103.6 percent and 73.7 percent of estimates, respectively. Development expenditure was much lower than planned because of the low rate of implementation of development projects.

Chart-4: Government Expenditure, Fourth Quarter 2015

Billions of Tshs



Source: Ministry of Finance and Planning and Bank of Tanzania

3.G National Debt

Domestic Debt

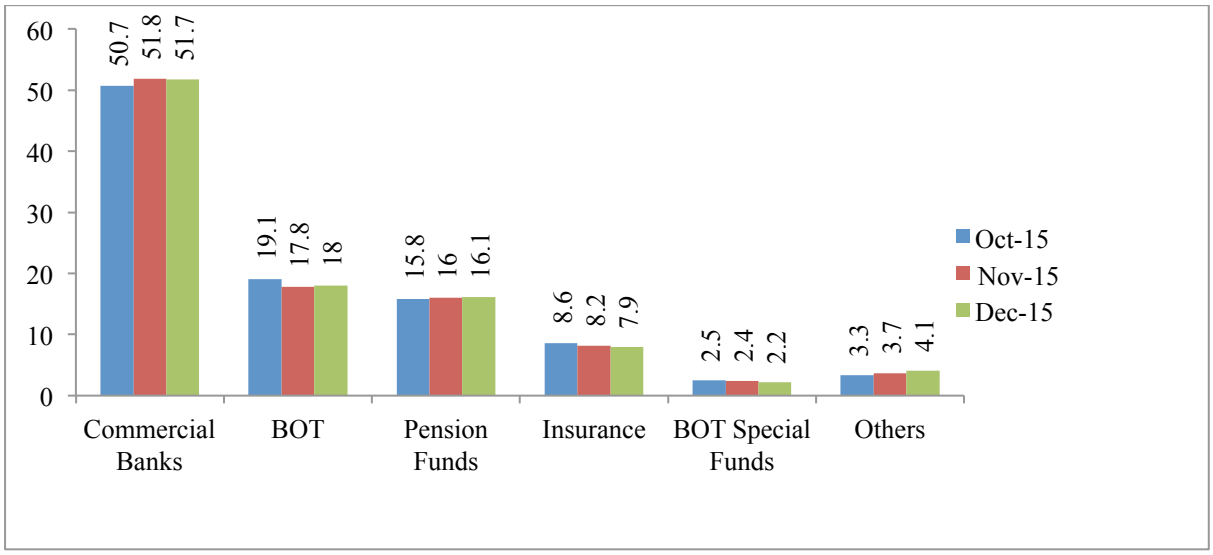
By the end of December 2015, domestic debt stock increased to TZS 8,597.0 billion, from TZS 3,596.5 billion at the end of the third quarter of 2015. On an annual basis, the debt stock increased by TZS 1,115.2 billion from the debt stock at the end of December 2014. The increase was mainly attributed to government financing needs. Domestic debt by creditor category indicates that commercial banks remained the leading creditor by holding 51.7% of the domestic debt, followed by the Bank of Tanzania that held 18.0%. Pension funds and insurance held 16.1% and 7.9% respectively (**Chart-5**). Domestic debt service during the fourth quarter of 2015 amounted to TZS 864.5 billion, of which principal of TZS 642.7 billion was rolled-over and interest component of TZS 642.7 billion was paid out.

External Debt

External debt stock declined to USD 15,408.5 million at the end of December 2015, a decrease of USD 15.1 million from the amount recorded by the end of September 2015. The decrease was on account of payment of principal arrears by the private sector. Out of the total external debt, 90.3 percent was Disbursed Outstanding Debt (DOD) and the remaining was interest arrears. The external debt stock by borrower category shows that 80.8% was Government debt, while debt owed by private sector and public corporations accounted for 15.2% and 4.0% respectively. External debt service during the quarter amounted to USD 75.0 million, out of which USD 60.4

million was interest payment and the balance of USD 14.6 million principal repayments.

Chart-4: Domestic Debt by Creditor Category, Fourth Quarter 2015



Note: Others include other official entities, and,private companies and individuals.
Source: Bank of Tanzania

4. External Sector Performance

4.A Current Account

The current account deficit narrowed during the quarter ending December 2015 to USD 13.7 million, from USD 965.6 million in the quarter ending September 2015 and USD 1,076.2 million recorded in the corresponding period in year 2014. The development was largely attributed to a significant decrease in imports.

The decline in official transfers by 10.7% was contributed by volatile global financial markets which limited development partners disbursements to support the Government in implementation of its budget.

Table-3: Tanzania Current Account Balance

Item	Quarter-ending			% Change
	Sept-15	Dec-14	Dec-15	
Goods Account (Net)	**-1,141.6**	**-1,287.5**	**-325.7**	**-74.7**
Exports f.o.b	1,330.8	1,591.6	1,705.6	7.2
Imports f.o.b	2,472.4	2,879.1	2,031.3	-29.4
Services Account (Net)	**290.5**	**263.7**	**346.1**	**31.3**
Receipts	1,020.0	972.1	967.6	-0.5
Payments	729.5	708.4	621.4	-12.3
Goods and Services (Net)	-851.1	-1,023.8	20.4	-102.0

Exports of Goods and Services	2,350.8	2,563.7	2,673.2	4.3
Imports of Goods and Services	3,201.9	3,587.5	2,652.8	-26.1
Income Account (Net)	-198.0	-158.5	-145.5	-8.2
Receipts	23.4	26.7	22.6	-15.4
Payments	221.4	185.2	168.1	-9.2
Secondary Income Account (Net)	**83.5**	**106.1**	**111.4**	**5.0**
Inflows	104.6	121.4	127.7	5.2
o/w Official transfers	4.6	33.0	29.5	-10.7
Outflows	21.0	15.3	16.2	6.1
Current Account Balance	**-965.6**	**-1,076.2**	**-13.7**	**-98.7**

Source: Bank of Tanzania

4.B Imports

Imports declined to USD 2,031.3 million from USD 2,879.1 million recorded in the quarter ending December 2014. All major import categories declined; with oil, foodstuff and building and construction equipment dominating. The decline of oil occurred in both volume and price; the latter directly linked with a sustained fall in prices of oil in the world market.

4.C Exports

Following a large increase in exports of non-traditional commodities, particularly gold, manufactured goods, and re-exports, earnings from goods exports during the fourth quarter of 2015 was recorded at USD 1,705.6 million, higher by 7.2 percent compared to the level recorded in the corresponding quarter in 2014. Manufactured goods increased by 29.4 percent to USD 427.5 million, with higher growth being recorded in export of textile apparel, footwear, sisal products and plastic items. Gold exports improved by 2.7 percent to USD 343.8 million, as a result of increase in volume as prices declined.

4.D World Commodity Prices

During the quarter ending December 2015, world market prices of most commodities were lower than the preceding quarter, except for sisal which remained unchanged. Coffee price declined as a result of favorable crop prospects in Brazil and Vietnam. The price of tea declined due to low demand from Russia and Middle East, while that of cotton was due to weak demand amidst increase in supply following bumper harvests in India. The decline in the price of cloves was due to expectations about increases in production in Sri Lanka, owing to favourable weather. Prices of crude oil and white petroleum products decreased on account of increase in production and weak global demand. The price of gold declined due to increased market expectations in light of an interest rate hike in the United States.

PART 2:

FINANCING OPTIONS FOR IMPLEMENTATION OF THE POST-2015 AGENDA IN TANZANIA

By: Dr. Hoseana Lunogelo, Richard Ngilangwa and Solomon Baregu

Abstract

This study demonstrates how financial resources be most effectively mobilised and channelled and how can they be combined with selected enabling policies and other means of implementation, to effectively support a transformative post-2015 agenda in Tanzania.

INTRODUCTION

Since liberalising the economy in the 1990s, Tanzania's financial sector has undergone substantial structural change. The reforms were spearheaded by the Bank of Tanzania (BoT), which aimed to promote a market-based financial sector in order to revamp the deteriorating economy and accelerate economic growth. The liberalisation made possible the participation of the private sector and foreign banks as the remaining controls were eliminated, while financial markets and indirect instruments of monetary policy were introduced (BoT, 2011). Meanwhile, the BoT has put in place legal frameworks for encouraging and regulating microfinance institutions, including the formation of community-based banks and the adoption of warehouse-receipt systems in the agricultural sector. The Ministry of Finance initiated a review of the Micro-Finance Policy so that it can take into account emerging financing instruments and the role of ICT (such as mobile money) in microfinance. The Micro-Finance Policy, will spell out measures to promote savings mobilisation and linking grassroots financial institutions with the banking system in or to stimulate rural transformation and agro-processing.

RESOURCE MOBILISATION AND THE FINANCING GAP

The government stresses the importance of mobilising financial resources from alternative sources to reduce the dependence on conventional sources such as domestic tax revenue; non-tax revenue (dividends, fees, and licenses); domestic borrowing; and grants and concessional and nonconcessional loans from bilateral and multilateral sources. Finance from these sources is used to pay for recurrent and public investment expenditures.

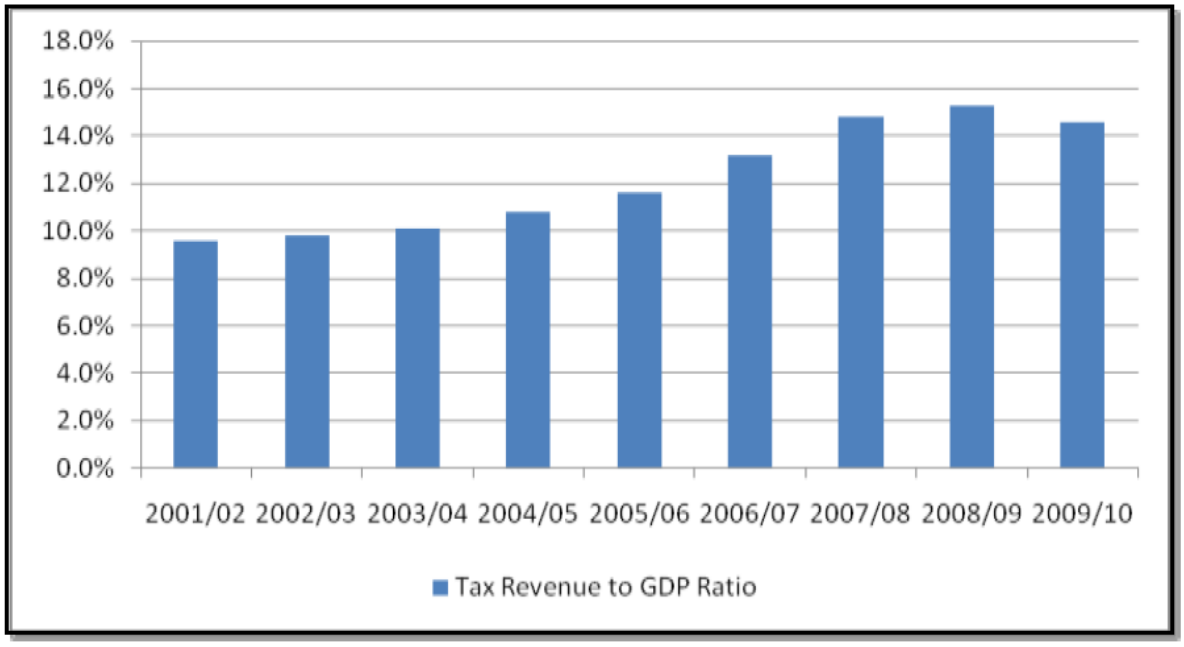
Table 1: Tanzania General Budget Support (GBS) in TZS million

Year	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Budget Support Grant	502,913	601,324	608,724	629,540	726,524	673,062
Budget Support Loan	287,422	362,073	331,923	585,125	201, 806	243,318
Total Budget Support	790,335	963,397	940,647	1,214,665	928,330	916,380

Source: Ministry of Finance (2012)

The government has also been receiving budget support (see Table 1) from the development community. This is channelled through the General Budget Support (GBS) as the government prefersthis in terms of predictability and government ownership of resource allocation (URT, 2012). In order to enhance the mobilisation of domestic resources, the government has made concerted efforts to maximise tax revenue collection and management by implementing a Tax Modernisation Programme and TRA Third Corporate Plan. The upward trend in the revenue-to-GDP ratio to date is attributable entirely to the performance of tax collection.

Figure 1: Tax revenue-GDP ratio, 2001/02–2009/10

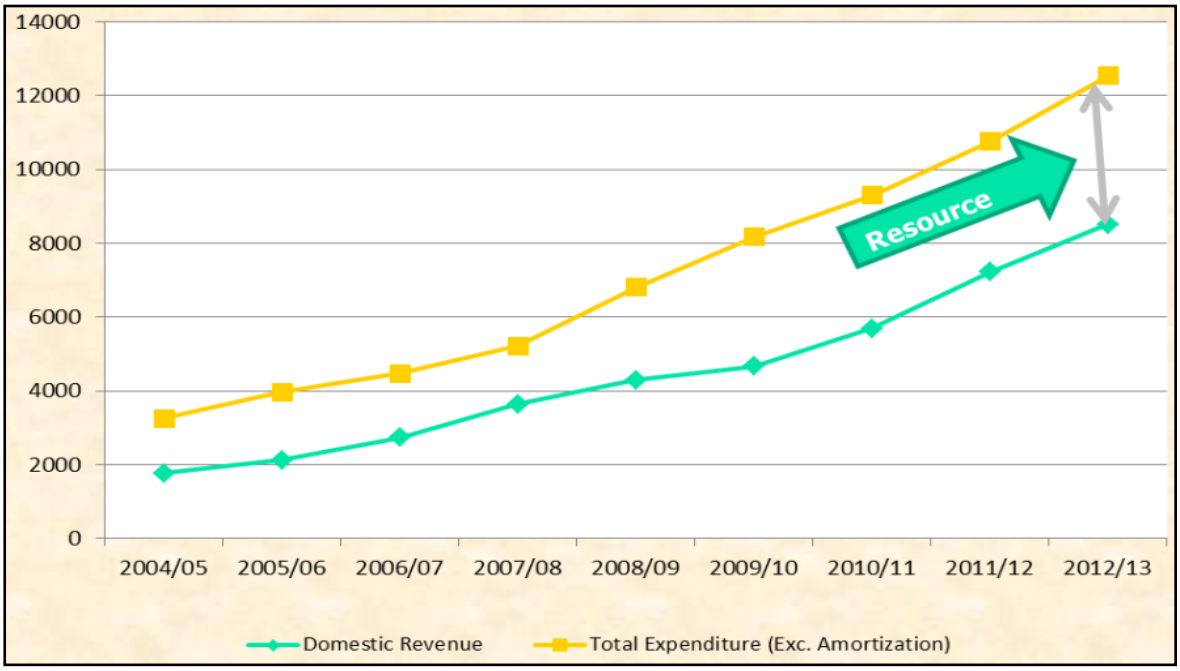


Source: TRA (2011)

The domestic tax-to-GDP ratio has been rising, despite fluctuations. It rose from 9.8% in 2002/03, to 15.3% in 2008/09, before dipping to 14.6% in 2009/10 as a result of the global financial crisis that affected export earnings and company profitability, and then recovered to the pre-crisis level of 15.3% in 2010/11. By 2011/12 the ratio had increased to 15.8% (Figure 1). The medium-term target is to exceed 18%.

In order to curb the increasing finance gap, the government has resorted to relying on grants,
domestic borrowing and non-concessional borrowing, although each has repercussions in terms of accessibility and conditionality. This has resulted in an increase in the national debt, reaching 17.3% of GDP in 2012 (Figure 2). The government is also determined to increase the ratio of domestic revenue collection to GDP from the current level of around 15% to 18% over the next five years (Bevan, 2012). As stated above, the Tanzania Revenue Authority (TRA) has embarked on a Tax Modernisation Programme and Corporate Plan. These focus on four main aspects, namely to (a) broaden the tax base; (b) strengthen the TRA to make tax administration more efficient and effective; (c) improve tax administrative infrastructure; and (d) curb tax evasion and minimise revenue loss through tax exemptions and the informal sector

Figure 1: Financial resource gap (2004/05–2011/12) in TZS billion



Source: Ministry of Finance (2012)

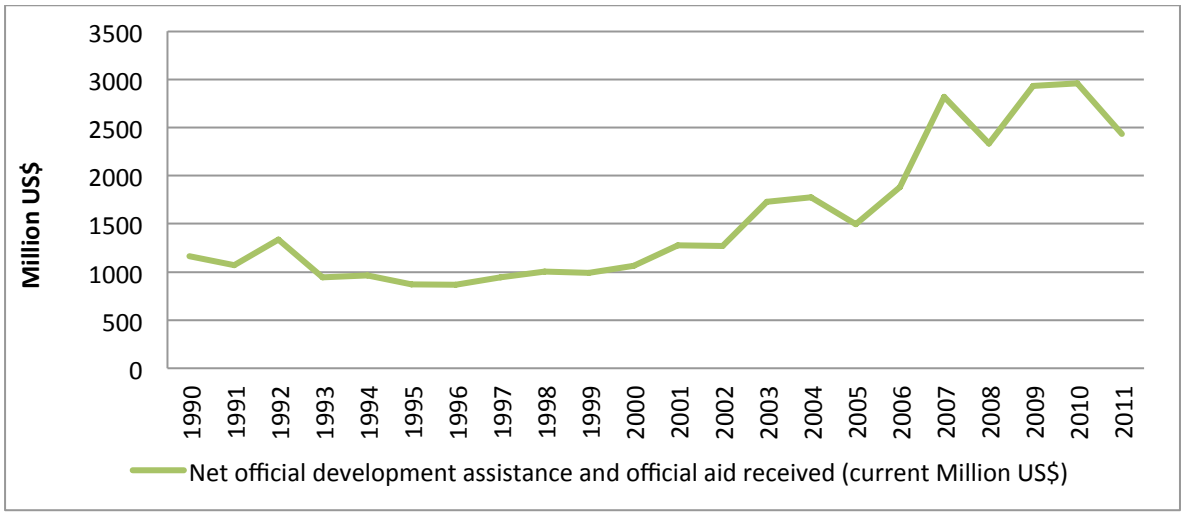
Due to these measures, the ratio of domestic tax revenue to GDP has been growing in the past decade, but government expenditure has been increasing even faster, thus widening the resource gap as depicted in Figure 4.

FINANCE OPTIONS

A. Official Development Assistance

The net ODA and other official aid to Tanzania have been increasing over the past two decades (see Figure 3), except for the food crisis in 2007/08 and the post-global financial crisis period of 2009/10, which affected donor countries. Tanzania is one of the few African countries to have benefitted from increased donor support thanks to its relatively sound public governance. Nevertheless, due to the rapidly expanding economy, net ODA as a proportion of Gross National Income (GNI) has been on the decline (Figure 4), even though ODA has slightly increased in absolute terms. Despite having policies and strategies to increase domestic resource mobilisation (DRM), the country has been net recipient of ODA, mostly in the form of loans, grants, and contributions (which do not require repayment). Much of the ODA is allocated to poverty-reduction and development interventions, as well as government development expenditure, accounting for around 40% of the national and 80% of the development budget.

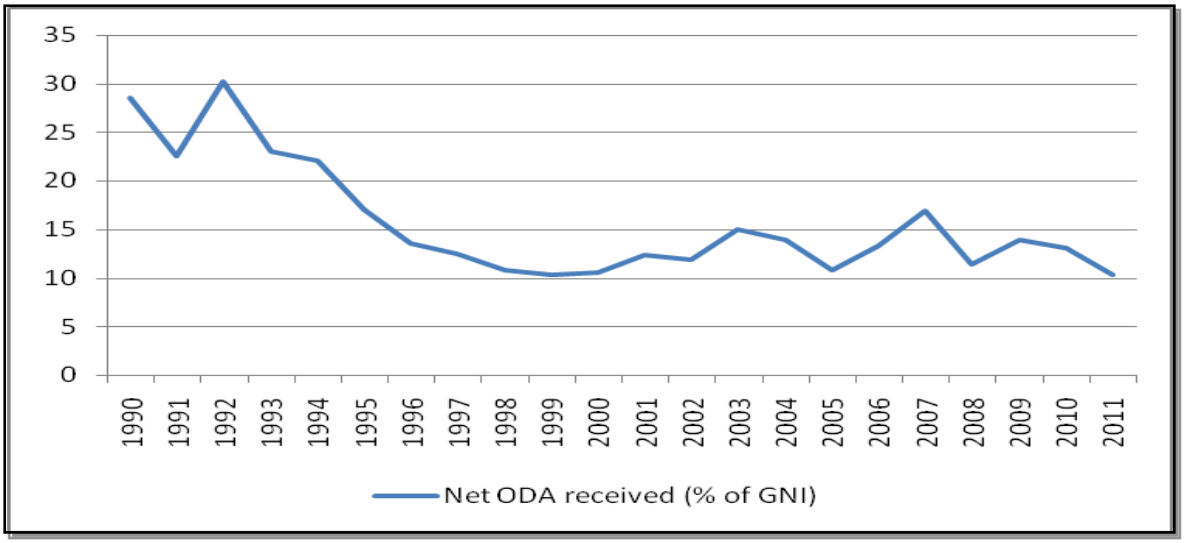
Figure 3: Net ODA and other official aid received, 1990–2011 (current USD million)



Source: WDI (2014)

Development assistance increased substantially following a brief decline during the early 1990s when Tanzania was undergoing economic management policy and legal reforms. Reforms in the financial sector have led to an increased number of established financial institutions and widened the scope of services offered.

Figure 4: Net ODA received (% of GNI), 1990–2011



Source: WDI (2012)

There remain constraints in widening the domestic tax base, relying heavily on a few firms and less than 3 million salaried employees. This has compelled the government to continue its dependence on ODA to meet the budget deficit, which has in turn increased the foreign debt, such that by 2012/13, about 10% of the annual budget was allocated to debt servicing.

Table 2: Finance options trends, 2000–2011

Year	Net ODA received (% of GNI)	Domestic credit to private sector (% of GDP)	Personal remittances, received (% of GDP)	Foreign direct investment, net inflows (% of GDP)	External Debt (% of GDP)	Domestic debt (% of GDP)	National Debt Growth rate
2000	10.52	4.09	0.08	4.55	76.2	11.8	-0.1
2001	12.41	5.38	0.15	3.74	61.6	9	-18.3
2002	11.87	6.83	0.11	3.67	63.6	8.3	6
2003	14.96	8.08	0.08	3.12	64.5	7.4	8
2004	13.94	9.24	0.11	1.77	64	7.1	8.8
2005	10.83	10.18	0.14	6.62	56	11.3	5.7
2006	13.31	12.74	0.11	2.81	32.7	10.9	-35.2
2007	16.93	14.89	0.15	3.46	34.4	10.7	21.6
2008	11.41	16.08	0.18	6.68	30.3	7.1	1.6
2009	13.91	15.33	0.19	4.46	36.1	9.1	26.4
2010	13.08	16.21	0.24	8.03	37.7	10	13.1
2011	10.32	17.77	0.33	5.15	37.7	10.7	5.7

Source: BOT (2013)

In the last ten years, then, Tanzania's national debt has risen because of the growing finance gap. Although the external debt has been decreasing over time, ODA and domestic credit have played a crucial role in filling the finance gap (see Table 9). Personal remittances have shown a slight increase as a ratio of

GDP, and greater effort is needed to attract more remittances.

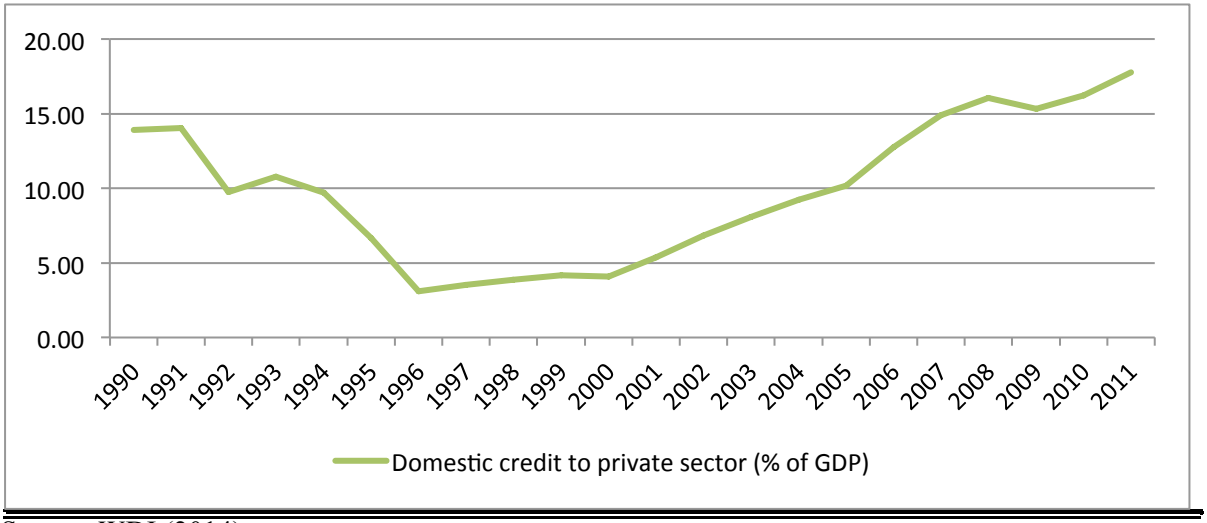
B. Domestic credit to the private sector

Since the liberalisation of the financial sector in the mid-1990s, there has been an increase in
domestic credit to the private sector as proportion of GDP (see Figure 5). With the opening up of the banking and financial sector, private-sector operators have more options for obtaining credit and loans in the country, although funding of the agricultural sector is low, attracting less than 5% of bank loans in the country (ESRF, 2013).

C. Foreign Direct Investment

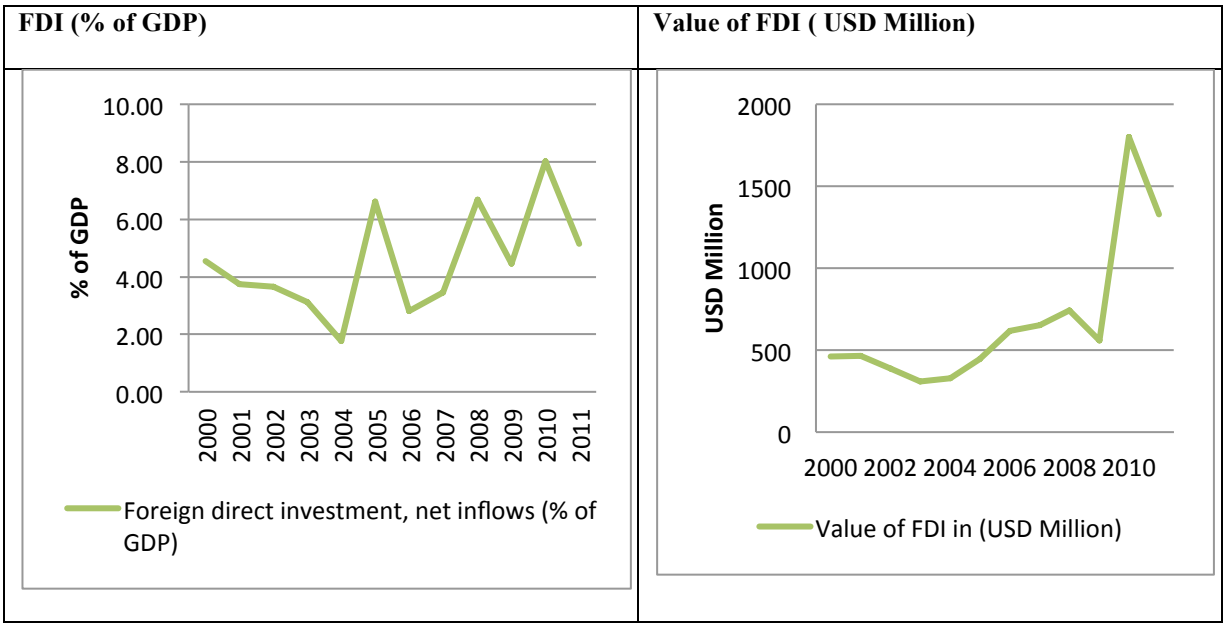
In the past decade, Tanzania has witnessed an overall increase, although fluctuating, in the flow of foreign direct investment (FDI). The net inflows as a proportion of GDP reached 8% in 2010 (see Figure 6), with a value of USD 1,800 million (see Figure 6). Investments have been in the mining (and natural gas exploration and extraction) sectors and the service industry (especially finance and tourism). More FDI is expected in the coming decade as value-addition of natural gas and iron ore takes off. As mentioned earlier, although these investments have led to sustained GDP growth of over 6.5% over the past decade, the rate of job creation has been less than the increase in the number of new entrants to the labour market each year.

Figure 5: Tanzania's credit to the private sector (% of GDP) 1990–2011



Source: WDI (2014)

Figure 6: FDI as % of GDP (left) and value of FDI in USD million (right)

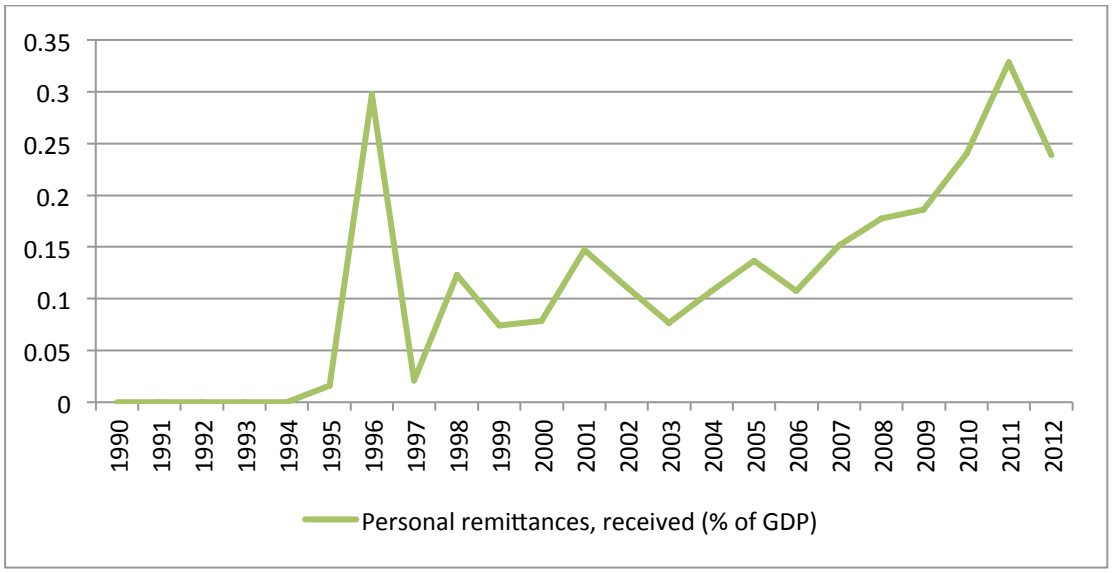


Source: WDI (2014) and MoF (2013)

D. Remittances

Since economic structural adjustment started taking shape in the early 1990s, the country has witnessed a gradual increase in the flow of recorded remittances, thus contributing to the GDP (Figure 7).

Figure 7: Remittance transfers as percentage of GDP, 1990–2012



Source: WDI (2014)

However, there are still challenges in recording the remittances, such that the amount recorded is less than 1 percent of GDP. This calls for concerted efforts by the government to encourage its people working and living outside the country to

invest back home and also improve capture of data of such remittances.

Although these are usually targeting individual people in the country, but with more remittances then it results to increase in investments made by resident households (Lunogelo, 2009). Tanzanian banks have introduced innovate products suited for the needs of the Diaspora community, while the Government has established a dedicated Diaspora Department in the Ministry of Foreign Affairs to monitor and coordinate developmental efforts by Tanzanians living abroad. It is still early to judge the success of these initiatives.

FUTURE PROSPECTS

There are several potential options for development financing. The most obvious will certainly involve expanding the domestic tax revenue base given that fewer than 3 million of 22 million economically active Tanzanians are registered to pay tax. Measures to formalise informal operations will need to take centre stage. Logically, this route is more sustainable since as firms thrive and the economy expands in response to the impact of enablers, the government will be able to collect increasing revenue to finance development, in turn creating more jobs and exports. A functioning economy will also attract more FDI as the country's eligibility to borrow from the international money market, and ability to service both the domestic and foreign debts, will be sustained. In the transition period to 2020 Tanzania will continue to rely on a mixture of domestic tax and non-tax revenues, ODA and sovereign bonds. Judging from the initial draft of the post-2015 strategic development objectives, it also obvious that the international community will encourage Tanzania and other developing countries to switch from bilateral aid/grants to trade engagements through a well-supported private sector. This means that complementary policies will be essential in order for domestic enablers and international private-sector finance and trade to thrive. Beyond 2020, when the existing investments in extracting off-shore natural gas and more diversified mineral extraction start to yield dividends, the country will be increasingly able to reduce the reliance on aid/grants, and as some of the revenue from the sub-sector is used to clear old stock of domestic and international debt. Of course, this will depend on reaping the benefits from the sector with minimal disruptions as the country adheres to strategies for the proper management and governance of the sectors, guided by policies to prevent a 'natural resource curse' and encourage the development of local content along the value chain.

The government considered the use of sovereign bonds to finance infrastructural projects to supplement domestic revenue after Tanzania's sovereign rating improved and it was therefore
qualified to issue bonds. This has been one result of good economic governance, as has been recognised by the international community. Most of the funds raised from the bonds will be used to modernise the country's transport infrastructure (mostly roads, ports and railway). Given the critical importance of electricity in economic transformation (UNECA, 2014) Tanzania will continue to encourage and perfect PPPs as a means to mobilise finance through IPPs and to support

diversified investments in alternative power sources. Support both to the government and the private sector to prepare bankable projects and business plans is another area that will require further technical assistance, to judge from experiences in countries where PPP has worked best. This said, for PPPs to succeed in the shortest time possible the government will have to step up its support to private sector operators interested in investing in the generation of hydropower and wind energy. Among the obstacles such operators encounter are lengthy bureaucracy and delays in approving applications by regulators such as TANESCO. A case in point is the delayed launch of the Makambako wind-power project. TANESCO has been postponing final negotiations with the investor for two years, thus risking the validity of financing agreements and the patience of communities who surrendered their land for the project and eagerly await activities on the land near their villages. As already noted, the discovery of huge stocks of off-shore natural gas is likely to influence the diversification of development financing beyond 2017 when production commences. Of interest in Tanzania will be to analyse the impact of the new constitution in promoting foreign and domestic resource mobilisation and investment. The issue of dual citizenship, for example, will have a bearing on the contribution of the Tanzanian diaspora to nation building. Tanzania has been one of the African countries that have resorting to heavy borrowing from the international community (UNECA, 2013). The new constitution will also provide guidelines on management of foreign debts among the constituent countries in the Union of the United Republic of Tanzania.

Among the newly created resource-mobilisation instruments that will require further articulation and strengthening are:

1. The use of well managed social security funds in infrastructural development, which in recent years has included the National Social Security Fund (NSSF) investing in a 500-metre bridge linking the Dar es Salaam Business District and the planned modern satellite city of Kigamboni.
2. Citizen mobilisation to buy shares in unit trusts, such as the Tanzania Unit Trust, which is already operational.
3. Establishment of private equity funds, such as the Mkoba Private Equity Fund recently established with a capital base of USD 300 million.
4. A Development Fund based on the proceeds of oil and natural gas, some of which is to be used to stimulate development at the level of local government.
5. Establishment of a continental monetary fund (AMF) to 'promote and facilitate, the establishment of commercial payment and encourage capital flows between African countries.
6. Improvements in the institutional arrangements for the development and management of the energy sector that will remove the inefficiencies inherent in TANESCO's monopoly.

There will be a need to pay special attention to ensuring that whatever is done to improve the investment conditions in Tanzania and in Africa more widely, that local private entrepreneurs receive the necessary support to become the driving force of economic transformation. The EU should regard this as one of the

complementary measures in supporting the development of infrastructure in Africa.

FISH-FARMING VALUE CHAIN AND POLICY ANALYSIS: TRANSFORMATION FOR LOCAL MARKETS, ECONOMIC GROWTH AND POVERTY REDUCTION IN TANZANIA

By Dr. Fancis Mwaijande, Dr. Donatilla Kaino, Patricia Mwesiga and Prudence Lugendo

Abstract

The study examined the fish-farming sub-sector in Tanzania as governed by the Fishery Act No. 22 of 2003 with the associated regulations and the National Fisheries Sector Policy and Strategy Statements of 1997. The Policy and its Strategy Statements aim at transformation of the fisheries sub-sector into sustainable commercial fishing, fish-pond farming, and processing for both domestic and foreign markets, and compliance to domestic and foreign market requirements while conserving the environment. Although the Fishery Act exists, fish-farming sub-sector is still underdeveloped and is undertaken at subsistence level. Therefore, for it to contribute to food security, economic growth and improvement of the well being of its stakeholders, informed policy reforms to address the constraints in the sub-sector are pertinent.

This study was undertaken to identify the challenges and gaps in the pond fish value chain that are required to be addressed and filled for the transformation to take place, the main constrains which were found during the baseline survey include: inadequate technology in terms of pond construction, species and sex of fingerlings, fish feeds processing, fishing gear, hatchery and storage facilities. The fish-farming transformation is also constrained by insufficient or absence of the extension services required for imparting knowledge and skills on proper use of best fish-farming management practices and for introducing new and appropriate technologies. Furthermore, in-access to financial services made majority farmers fail to maintain and expand their farms, to buy and use modern fish farming tools.

Transformations in pond fish farming sub-sector will therefore, only happen if the Government facilitates fish-farmers access and efficiently utilise financial services, technologies, and best management practices. This could be done by among other things, providing subsidised fish farming facilities and credit in order to enable farmers to establish fish feed production industries and purchase the required tools for modern fish farming. Fish farmers must be provided with free, consistent and sustainable extension services for them to appropriately transfer and apply knowledge.

Formulation of pond fish farmers' cooperatives can help to solve the problem of access to financial services by providing group security for the members to borrow from formal and informal financial services providers.

INTRODUCTION

Tanzania has the greatest fisheries potential in Africa, as reported by Food and Agriculture Organization (2012); it is ranking in the top 10 countries in terms of total capture fisheries production with annual fish production of about 341,066 tones. According to National Economic Survey (2009), the fisheries sector is among the important economic sub sectors of the Tanzania economy yet not fully exploited and integrated in the poverty reduction plans. Fishing recorded a growth rate of 2.3% in the third quarter of 2012 compared to a growth rate of 1.5% in the similar quarter of 2011. The growth was mainly attributed to increased demand for fish and fish products both at local and foreign markets. Statistics indicate that, the sector contributed about 1.4% to the Gross Domestic Product (GDP) compared with over 10% contribution for the last 10 years (NBS, 2012). Per capita fish consumption is 8.0 kg and about 30% of animal protein consumption in Tanzania (Kweka *et al,* 2006; National Economic Survey, 2009).

Substantial fishing comes from fresh water, marine water, rivers and dams, such as, Lake Victoria, Lake Tanganyika, Lake Nyasa, lake Rukwa, territorial sea, and Exclusive Economic Zone. Though the country has the greatest fish farming potential in Africa, it has not adequately tapped it (FAO, 2012). The industry is dominated by freshwater fish farming in which small-scale farmers practice both extensive and semi-intensive fish farming. Small fish ponds are integrated with other agricultural activities such as gardening and animal production on small pieces of land. Tanzania is currently estimated to have a total of 14100 freshwater fish ponds scattered across the mainland (FAO, 2013). Available historical data suggest that while the total number of fish ponds has been, decreasing, production volume has been increasing over time. Since its inception in late 1940s the estimates show that the industry produced about 3000 tons of fish annually, from more than 8000. Over time the production has slowly grown and by 2010 its annual fish output had reached about 9500 tons and the number of ponds had increased to 14,740, then after decreased to 14100 in the years between 2010 - 2013 (URT, 2010; FAO 2013).

The potential contribution of fish farming on Tanzanian household income has yet to be realized. Vast potential for aquaculture in Tanzania is largely untapped and remain at subsistence level (Chenyambuga et al 2012; FAO 2013, TKNET, 2014). These studies however, do not explain opportunities and constraints existing along the pond fish farming value chain. This information is important to guide the focus of strategies aiming at transformation of aquaculture to commercial levels. This study bridged this information gap by exploring the potential for up scaling subsistence fish farming to

commercial while strengthening fish value chain for developing high value markets.

Study Objectives

The general objective of this study was to examine the potential transformations in the fisheries sub-sector, while focusing on fish value chain, with special emphasis on pond fish farming. Specifically, the study aimed to:

(i)Characterize fish farming communities and applied technologies,

(ii) Unleash the potential economic opportunities throughout the fish value chain, and

(iii) Generate and disseminate evidence for informed policy decisions for promoting value addition and technology innovations uptake.

METHODOLOGY

Study Area

The study was conducted in 6 regions Kilimanjaro, Kagera, Njombe, Mbeya, Morogoro and Ruvuma Regions of Tanzania. The regions were selected based on the existence of greater number of fish ponds relative to the rest of regions in the country (URT, 2012). Within each region two districts were covered as follows; Kilombero and Ulanga from Morogoro; Rungwe and Mbozi from Mbeya; Makete and Njombe urban within Njombe; Songea rural and Namtumbo from Ruvuma; Mwanga and Same from Kilimanjaro; Bukoba urban and Muleba districts from Kagera.

Study Design and Sampling

Cross-sectional research design was employed whereby, qualitative and quantitative data were collected once at a time from each area. The study employed multi-stage sampling procedure. First, the above mentioned Regions and two Districts from each region were selected purposely based on availability of reasonable number of fish farmers. This was guided by the secondary data obtained from the Ministry of Fisheries and Livestock Development. Second, under the guidance of the respective district fisheries officers, 293 fish farming actors were randomly selected and interviewed.

Data Collection

The study collected both qualitative and quantitative data to allow complementarity of information. Structured questionnaires were used to collect quantitative data and qualitative data was collected by using a closed-ended questionnaire to fish traders and processors.

STUDY FINDINGS

A. Social Economic Characteristics of Fish Faming Actors (FFA)

Study results show that Mbeya and Njombe had higher proportion of female fish farmers respectively of 25.4% and 21.9%. According to the information on education levels, more than 70% of respondents had attained primary education and very few of them (0.7%) were university graduates (Table 1). The results on the education level of fish farm actors imply that the majority lacked necessary skills for running their activities smoothly and in a profitable way.

Table 1: Social Economic Characteristics of FFA Regional Wise (n = 293)

Variable		Kagera n= 49	KLM n= 59	Mbeya n= 59	Morogoro n= 60	Njombe n= 32	Ruvuma n= 34	Total
	18 -50	35(71.4)	33(55.9)	40(67.8)	45(75)	26(81.2)	24(70.6)	203(69.3)
	51+	14(28.6)	26(44.1)	19(32.2)	15(25)	6(18.8)	10(29.4)	90(30.7)
	Degree				1(1.7)		1(2.9)	2(0.7)
	Diploma	2(4.1)	2(3.4)	-	2(3.3)	1(3.1)	1(2.9)	8(2.7)
	A level	3(6.1)	1(1.7)	1(1.7)	-	1(3.1)	1(2.9)	7(2.4)
	O level	19(38.8)	18(30.5)	8(13.6)	11(18.3)	3(9.4)	6(17.6)	65(22)
	Certificate	1(2.0)						3(1.0)
	Primary	24(49)	38(64.4)	49(83)	44(73.3)	26(81.2)	23(67.6)	204(69.6)
	Informal			1(1.7)	1(1.7)		2(5.9)	4(1.4)
	<= 5 yrs	38(77.6)	44(74.6)	45(76.3)	40(66.7)	23(71.9)	27(79.4)	217(74.1)
	5 years	11(22.4)	15(25.4)	14(23.7)	20(33.3)	09(28.1)	07(20.6)	076(25.9)
	Male	45(91.8)	44(74.6)	56(94.9)	47(78.3)	25(75.1)	27(79.4)	241(82.3)
	Female	4(8.2)	15(25.4)	03(5.1)	13(21.7)	07(21.9)	07(20.6)	052(17.7)

Note: Figures in brackets are expressed in percent.

Work Experience and Age of Actors

Majority of respondents (74%) had a farming experience of one to five years. However, the fish farming experience among respondents ranged between 1 year (20%) and 35 years (0.3%). These results imply that most of the actors were not staying in the industry for long, due to lack of economic motivation as mentioned by FAO (2004-2014), or due to hardships faced by farmers in obtaining inputs as pointed out by FGD discussants. However, the experience has potential for growth of fish-farming because the mainstreams (69%) of interviewed fish farmers were aged within the range of active age between 18 and 50 years. Chenyambuga *et al.* (2011) also reported similar findings that majority of fish farmers belong in an active working group of age between 25 to 50 years. This was an interesting observation because many youth shy away from crop farming activities, but fish-farming has attracted their interests because this type of farming is less labour intensive.

B. Available Fish Farming Technologies

Types of Inputs

The majority of the farmers were keeping tilapia (97%) and very few were keeping catfish (Kambale). With respect to sex of farmed fishes, a significant proportion (21.8%) of respondents did not know the sex of fish they raised while majority of them (76.5%) were keeping both male and female fish. Keeping both sex means that fish increases reproduction hence, creating high competition for space, air and food. This practice made it impossible for the study to obtain correct information on the number of fish kept per each pond. According to extension services and best practice management, Monosex fish-farming is more profitable. Mono-sex fish farming technology has been used for the purpose of increasing the productivity of fish farmers in many places. Some of the empirical reviews from different areas suggest that, the technology can increase productivity and reduce the problems of food security and poverty within the fish farmer's communities (FAO 2004-2014).

All interviewed farmers used local feeds such as domestic leftovers, cereal bran, vegetables and wild grass. There are no special feeds for fish; one has to feed them using what is available per season. This finding implies that there is a room to improve knowledge and skills on fish feeds among the relevant actors along the fish farming value chain.

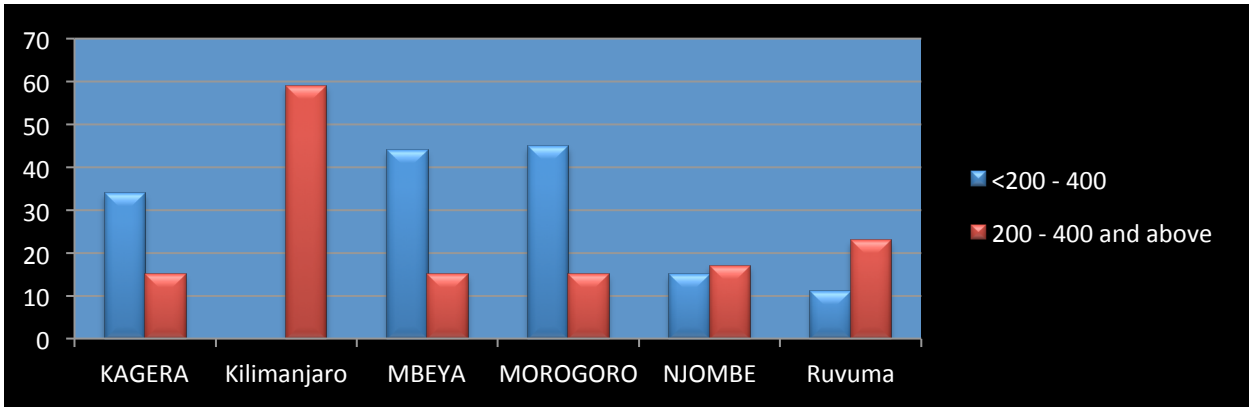
Farming Facilities and Equipment

As far as the use of improved farming equipment is concerned the study found that very small proportions of respondents were using equipment such as water pumps (5%), weigh balance (4%), and generators (3%). Others are Fish nets and scooping nets which were reported to be used by 17% and 1% of respondents respectively.

Fish pond size

More than half of fish farmers from Kagera, Njombe and Morogoro regions possessed fish ponds of less than 200-400M in size. However, the recommended pond size as reported by the national fisheries extension service officers is 200m x 400m sufficient for introducing 900 fingerlings in commercial fish farming. As shown in figure 1 below, 86% of respondents were underutilizing the fish ponds by planting smaller number of fingerlings, whereas 33% of respondents were planting fingerlings which were above the recommended number of fingerlings per pond size for commercial farming.

Figure 1: Results of Descriptive Statistics Showing the Sizes of Fish Ponds



This finding implies that there is a need for improvement of knowledge and skills relative to appropriate size of ponds and proportion of fish to be planted.

Water Use, Harvest Schedule and Weight of Harvested Fish

One of the best practices in fish-farming is the requirement for rotational change of water. The study examined the way farmers rotate water in their ponds and the results are presented in Table 2. A significant proportion of respondents (37%) were not changing pond water and majority of them (82%) were not using energy to pump water. With respect to fish harvesting schedule and weight of fish at harvest only 19% of farmers were harvesting after six months as recommended by extension officers.

Parallel to this, more than half of farmers were either harvesting under weight (37%) or unknown weight (26%). According to the Ministry of Fisheries, the recommended harvest schedule is 6 months and the recommended weight of fish ranges between 0.5 and 1kg. Therefore, the above findings imply that majority of respondents were not getting what actually they are supposed to gain from the activity. This is not strange because the majority of farmers as reported above were planting heterosexual species. These species in turn multiply and create high competition for food, space and air. By so doing the process of growth and development is hindered.

Table 2: Water rotation, energy for pumping water and harvesting sequence (n= 293)

Variable		Frequency	Percent
Regular water change	None	109	37.2
	Once	87	29.7
	Twice	77	26.3
	Thrice	20	6.8
Energy type	None	239	81.6
	National Electric grid	23	7.8
	Solar	4	1.4
	Generator	8	2.7
	Gravity	17	5.8
	Mechanical pump	2	.7
Harvest schedule	<6 months	70	23.9
	6 months	56	19.1
	>6 months	103	35.2
	Irregular	64	21.8
Weight of fish	<0.5kg	108	36.9
	0.5kg – 1kg	97	33.1
	>1kg	12	4.1
	Do not know	76	25.9

Available Skills and knowledge

Fish-farming, processing and trading requires basic as well as specialised training such as record keeping, pond management, feed production, fingerling selection and water management (Adinya *et al*, 2011). Study results show that majority of respondents (75%) did not have record keeping skills. The results imply that the area of training calls for capacity building as a fundamental intervention for transforming the sub-sector into commercial fish-farming.

Availability and Status of Storage and Transport Infrastructure

It was observed that most of the fish ponds were located strategically to allow smooth flow of water in and out without the use of energy to pump water. This necessitated the ponds to be located in the valleys where roads were very poor or there were no roads at all. And since they were not using energy, farmers did not possess or use any cooling equipment. A majority of traders, as explained by focus group discussants preferred dried fish to fresh fish. This is because by trading dried fish they avoid the costs attached to freezing, including purchase and maintenance of refrigerators as well as energy bills. The survey however, managed to identify a few fish mongers who owned deep freezers and were dealing with fresh fish from deep

waters. According to FGD discussants, the fish mongers were not aware of the existence of fish farmers in that area indicating lack of linkage among the FFA.

ECONOMIC OPPORTUNITIES AND CONSTRAINS ALONG THE FISH-FARMING VALUE CHAIN

Sources of fingerlings and Feeds

Generally, farmers don't have good and reliable sources for fingerlings. This has two fold implications; first, there is an opportunity for private sector to invest in fish hatchery. Second, there is a need for the government and agricultural research institutions to support farmers with appropriate skills and knowledge on fish breeding and to enhance the entire value chain. Having quality sources of fingerlings will benefit the sub-sector by supplying quality fingerlings needed. This neccesitates prompt action because if not taken into proper consideration it will hinder the efficiency of fish farmers and consequently the quality of their products.

Furthermore, the lack of quality and reliable sources of feeds limits commercial fish faming in Tanzania. This implies that; first there is an opportunity for private sector to invest in production of fish feeds and the government to encourage the same. Second, there is a need also for the government and research institutions to introduce capacity building programs on proper preparations of fish feeds.

Marketing of Fish

Most (71.3%) of fish farmers sell their product to their neighbours. Other fish farmers sell their fish products through the village market (36.9%), some traders (retailers and whole sellers) buy fish from the farming site (22.9%). Very few (3.1%) export their fish product. None of the fish farmers was selling his/her fish product to the fish processing industry. This implies that they have not utilized other market niches such as the export market, fish processing industries, big hotels and regional markets and supermarkets. This may be compounded by the poor quality of fish produces and low capacity to meet the required market demand.

Fish farmers' preference on inputs

Knowledge on farmers' choice to a variety of fish or technology is an important element in promoting fish farming and measuring willingness to adopt technology. Most (66%) of fish farmers who responded to the study question preferred to raise tilapia fish followed by Nile tilapias (20.8%) and very few (less than 10%) preferred Smooth head catfish and Nile perch. This shows that there is an opportunity for fingerling breeders to maximize the breeding of the above mentioned species of fish as there is a readily available market.

Pricing Methods

Analysis of the methods through which fish farmers set prices revealed that 56 percent of fish farmers sell their fish at any price to ensure that they finish the whole harvested fish the same day to avoid loss

due to rotting. In addition, 41.3 percent of respondents just copy the price that is prevailing on the market. Only 3 percent of fish farmers set price of fish by adding a certain percent of cost (5% to 15%). These results imply that majority of fish farmers lack knowledge on pricing .

CHALLENGES FACED BY FISH-FARMERS IN THE STUDY AREAS

The most critical challenges as mentioned by a majority of respondents include lack of necessary inputs mentioned by 88% of respondents, lack of loans and credits as identified by 85.6% of respondents. Others are lack of appropriate fish farming knowledge and skills mentioned by 84% of respondents, lack of cooling facilities identified by 58.8%, thieves and wild animals said by 76% and lack of extension services mentioned by 72% of respondents.

Along with the above identified challenges, fish farmers cope through various innovations. For example, to overcome the inadequate feeds supply, about 90% of farmers made their own feeds,. It is important to note that some of the coping strategies are detrimental to the fish-farming sub-sector development. For example some farmers reduce the amount of the required daily feed. This strategy may not be useful for personal income or making the sector a business entity.

Obtaining quality or improved fingerlings is another critical problem facing fish farming in Tanzania. About 30% obtain fingerlings from rivers or ponds and 28% of the interviewed farmers raise their own fingerlings from their farms. This implies lack of quality assurance for the fingerlings. Other means for overcoming the critical problems as identified by respondents are summarized in Table 3.

Table 3: Means for Overcoming the Identified Fish Farming Challenges

Strategy	Percent
markets/marketing strategy	
Neighborhood/local market	97.3
Do not sell /home consumption	1.4
Transportation	
On-farm selling	82.0
Bicycle	4.7
On head	10.0
Hire motorcycle/car	1.3
Personal transport	1.3
To overcome electricity shortage	
Nothing	81
Use generator	3
To overcome water shortage	
Nothing	32.0
Digging stream from natural water source	18.7
Construct pond	7.3
Plant trees	1.3
Use tape water	4.0

To overcome lack of farming education	
Nothing	42.7
Attend seminars	2.0
Learn from peers	9.3
Seek extension education services	3.3
Group visits	7.3
Personal initiatives	30.0
To overcome lack of technology	
Nothing	86.0
Peer education	3.3
Extension services	4.0
Media / magazines	5.3
Seminars	0.7

POLICY RECOMMENDATIONS

In view of the observed constrains the study put forward the following recommendations;

- The study results depicted that there was a gap of knowledge and skills relative to appropriate fish-farming practices along the entire value chain. Fish farming development stakeholders are advised to design programs and projects that target at improved fish-farming and business knowledge and skills among fish farmers. The recommended capacity building programmes include feeding, pricing, proper pond size, water rotation and proper choice of fingerlings.

- According to the study results, the uptake of existing fish farming technology among fish farmers was very low. District extension offices need to work hard to enhance adoption of appropriate technology by fish farmers especially the readily available technologies such as raising monosex fingerlings that have a potential to reduce labour and time while maximizing profit. This can be achieved through awareness programs on appropriate low-investment technologies that have been developed by the national research and development institutions (R&Ds) including proper fingerlings and feeds. The available researches and technologies at Fisheries research institutions and Universities need to be disseminated to farmers.

- It was also observed by the study that there was unmet high demand for extension services among fish farmers with the existing extension officers lacking necessary knowledge and skills especially on the current technologies. The Government may address this gap by providing refresher courses to the extension officers but also recruiting more of them to meet demand.

- The study results show that there was inadequate access to inputs and implements: The Government may collaborate with private sector through the public-private partnership (PPP) to enhance access of fish farmers to fisheries inputs such as feeds, and fingerlings as well as implements including processing and packaging machineries and materials, cold room storage and transportation Encouraging

the private sector to establish fish feed milling will be necessary for ensuring the availability of quality fish feeds. Enhancing inputs and implements supply chain is recommended for ensuring a constant supply of quality fingerlings, feeds, packaging materials, processing and cooling medicines.

- Increase Appropriate low-investment technology uptake: Increase fish-farmers access to appropriate low-investment technologies that have been developed by the national research and development institutions (R&Ds) including proper fingerlings and feeds. The available researches and technologies at Fisheries research institutions and Universities need to be disseminated to farmers to bridge the gap between research and development. Enhancing inputs to the supply chain will be necessary for ensuring constant supply of quality fingerlings, feeds and medicines.
- It was found that insufficient capital and lack of credits hindered growth and development of fish farming. The government is advised to facilitate access to credit facility and provide subsidy for fish pond digging and purchase of seed fingerlings. Respective districts community development officers are also advised to facilitate the formation of cooperatives which may stand in place of collateral to enhance their access to credit from formal financial organizations.

- It was observed that the policy framework for regulating fish farming conflicts with that of the environment. Further the technology dissemination system was not clearly stated. The Ministry of Livestock and Fisheries Development (MoLFD) and in particular the department of fish-farming is advised to collaborate with the national Environment Management Committee in harmonizing the national environment and fishery policies for smooth and sustainable running of the fish farming industry. The MoLFD may also develop a robust information and communication plan to facilitate technology dissemination among fish farmers.