

**ACCELERATING PRO-POOR GROWTH IN THE  
CONTEXT OF KILIMO KWANZA**

**Paper Presented to the Annual National Policy Dialogue**

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**Joint Government and Development Partners Group**

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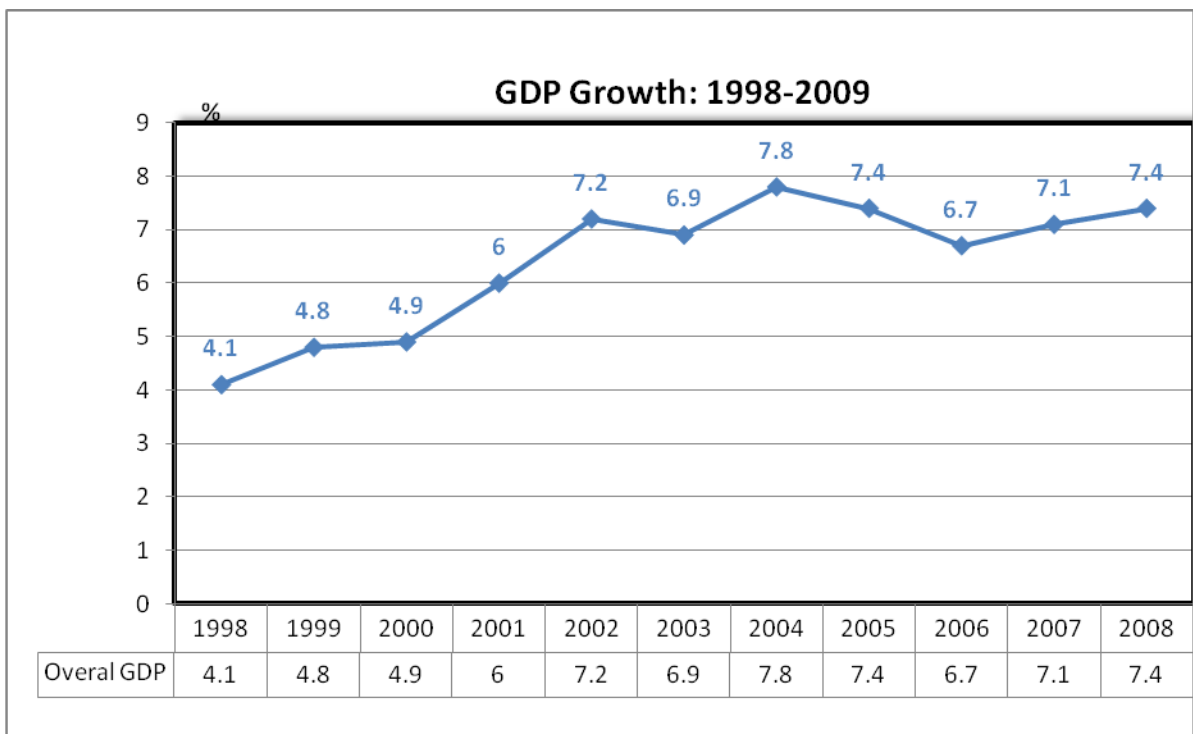
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## 1.0 MACRO ECONOMY

### 1.1 Macro-economic Growth

Since early 1990's Tanzania has implemented far reaching macroeconomic and structural reforms which has led to substantial socio-economic development. GDP growth per annum has almost doubled over the last decade from 4.1% in 1998 to 7.4% in 2008, with an average growth of 7% per annum. This is historically high for Tanzania and comparable to the performance of fastest growing economies in sub-Saharan Africa. GDP growth peaked in 2004 at 7.8%, but severe and prolonged drought during 2005/06 negatively affected the economy, and the GDP has been gradually recovering to reach 7.4% in 2008. The recent global economic and financial crisis is expected to slow down economic growth in 2009.

Figure 1: Real GDP Growth 1998 – 2008 (at 2001 constant prices)



Source: Economic Survey 2008

### 1.2 Private Sector Investments

### 1.2.1 Projects Registered

The overall number of projects registered by TIC increased from 111 projects in 1996 to 871 projects in 2008. The jobs created by these projects increased from 19,745 people in 1996 to 109,521 people in 2008. The following table shows number of projects registered through TIC since 2000-2008. Using TIC data as a proxy it can be deduced that agricultural sector has been very much marginalized by investors primarily because of lack of favourable finance and the high risk associated with agricultural projects

**Table 1: TIC Registered Projects, Employment and Value (2000-2008)**

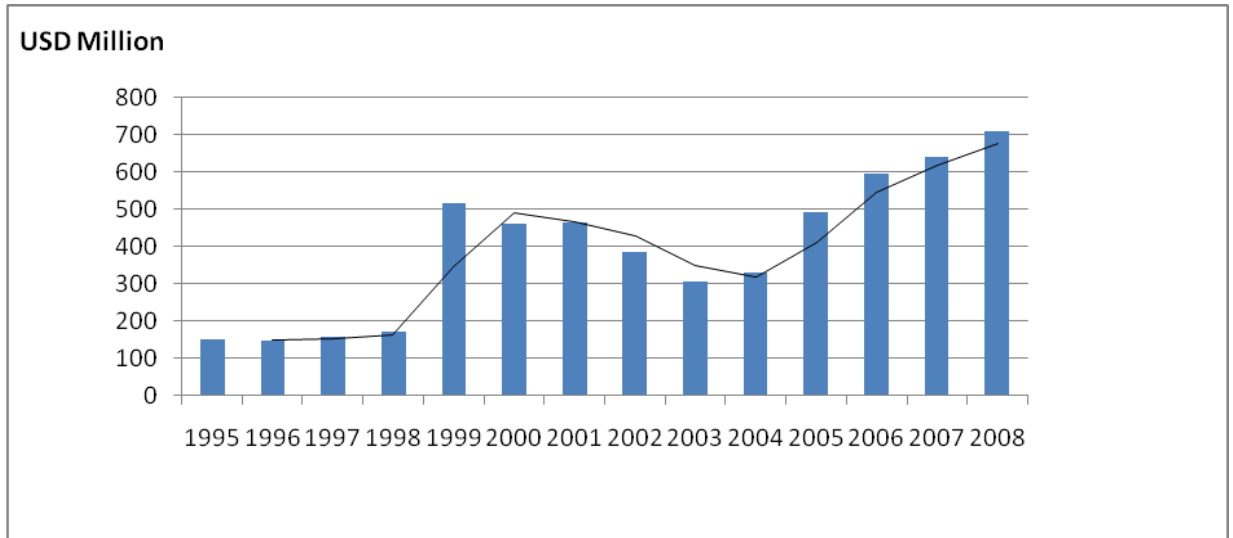
Year	Projects	New	Expansion Rehabilitation	Local	Foreign	Joint Venture	Jobs	Value; in USD Min
2008	871	621	250	450	208	213	109,521	6,680
2007	701	533	168	376	147	178	103,958	5,716
2006	679	454	225	345	161	173	74,946	5,431
2005	550	339	211	281	131	138	55,663	1,706
2004	454	269	185	208	119	127	56,057	1,133
2003	372	229	143	155	109	108	198,458	1,590
2002	311	206	105	126	104	81	33,132	1,072
2001	220	155	65	87	53	80	24,699	1,246
2000	178	127	51	64	46	68	19,535	874

Source: TIC

### 1.2.2 Foreign Direct Investment (FDI)

Foreign Direct Investment (FDI) has increased from USD 150.86 million in 1995 to **USD 717.7 million in 2008**. This growth of FDI is still very low when compared to global and SSA average, as well as in terms of the big demand for the attainment of robust economic growth and poverty reduction.

**Figure 2: FDI Trends, 1995-2008**



*Source: Computation from TIC Data*

## 2.0 SECTORAL PERFORMANCE

Sectoral performance during the past decade has been highly variable due to a number of factors including but not limited to weather, investment environment, technology, economic and financial infrastructure as well as human capital. While mining, construction and manufacturing recorded impressive growth rates, agricultural growth rate lagged behind. However, agricultural growth appears to be closely aligned to the GDP growth, implying continued strong influence of the sector in the national economy in spite of the decline in GDP contribution. On the average, between 2000 and 2008, the fastest growing sectors were mining (**13.7%**), construction (9.9%), services (**7.6%**) and manufacturing (**8 %**). The agricultural sector growth rate averaged 4.6 percent only.

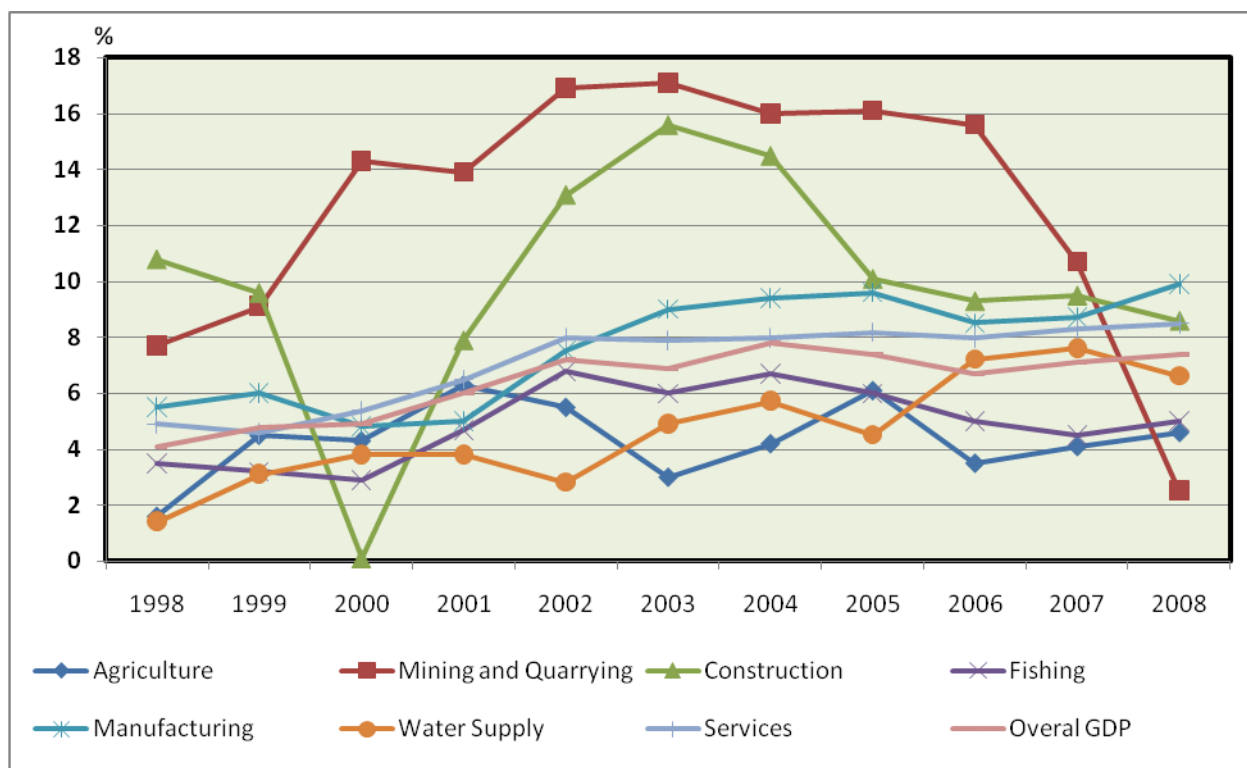
**Table 2: GDP Growth in Tanzania, by Sector, 2000 – 2008**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average

											e
Agriculture	4.3	6.3	5.5	3	4.2	6.1	3.5	4.1	4.6		4.6
Mining and Quarrying	14.3	13.9	16.9	17.1	16	16.1	15.6	10.7	2.5		13.7
Construction	0.1	7.9	13.1	15.6	14.5	10.1	9.3	9.5	8.6		9.9
Fishing	2.9	4.7	6.8	6	6.7	6	5	4.5	5		5.3
Manufacturing	4.8	5	7.5	9	9.4	9.6	8.5	8.7	9.9		8.0
Water Supply	3.8	3.8	2.8	4.9	5.7	4.5	7.2	7.6	6.6		5.2
Services	5.4	6.5	8	7.9	8	8.2	8	8.3	8.5		7.6
Overall GDP	4.9	6	7.2	6.9	7.8	7.4	6.7	7.1	7.4		6.8

Source: Economic Survey 2008

**Figure 3: GDP Growth in Tanzania, by Sector, 1998– 2008**



### 3.0 POVERTY TREND

3.1 The 2007 Household Budget Survey (HBS) provides new information to gauge progress towards MKUKUTA's poverty reduction targets. Data from the HBS 2000/01 and 2007 show a limited decline in income poverty levels over the period in all areas.

Over this period, the proportion of the population below the basic needs poverty line declined slightly from 35.7% to 33.6%, and the incidence of food poverty fell from 18.7% to 16.6%.

3.2 Poverty rates remain highest in rural areas: 37.6% of rural households live below the basic needs poverty line, compared with 24% of households in other urban areas and 16.4% in Dar es Salaam.

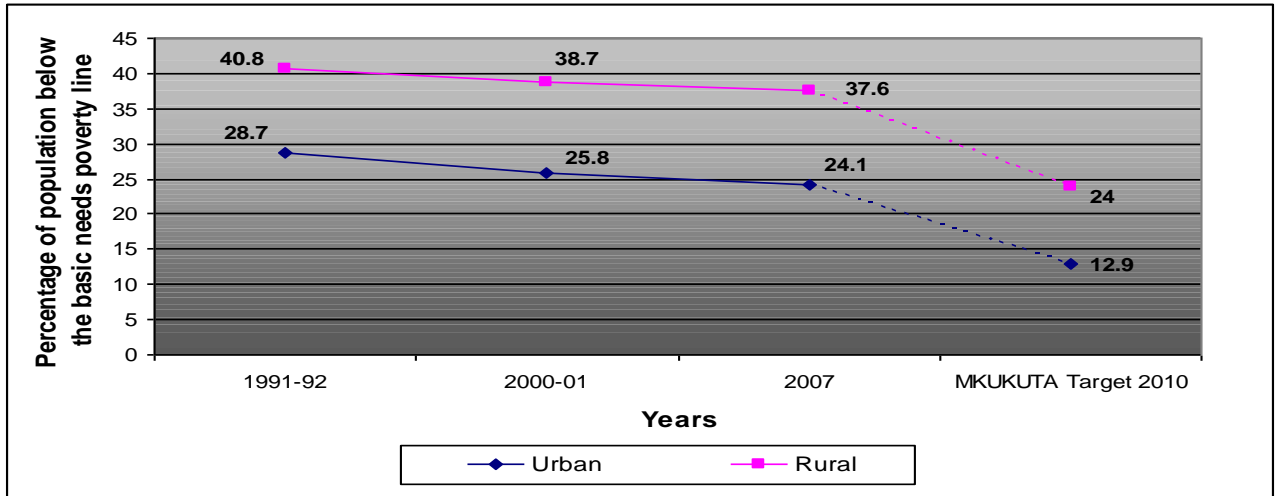
3.3 Table 3 shows both food and basic needs poverty incidence is serious in urban areas excluding Dar es Salaam, and rural areas. Figure 4 shows that there are low prospects towards attaining the MKUKUTA targets of income poverty reduction. Table 5 underscores the strategic position of the agricultural sector in poverty reduction given that more than 70 percent of the people are employed in agriculture.

Table 3: Incidence of Poverty in Tanzania

Poverty Line	Year	Dar es Salaam	Other Urban Areas	Rural Areas	Mainland Tanzania
Food	1991/92	13.6	15.0	23.1	21.6
	2000/01	7.5	13.2	20.4	18.7
	2007	7.4	12.9	18.4	16.6
Basic Needs	1991/92	28.1	28.7	40.8	38.6
	2000/01	17.6	25.8	38.7	35.7
	2007	16.4	24.1	37.6	33.6

Source: HBS 1991/92, 2000/01 and 2007

Figure 4: Trends and Targets of Income Poverty Reduction, Urban-Rural, 1991-92 to 2010



Note: Urban areas excludes Dar es Salaam

Source: HBS 1991/92, 2000/01 and 2007

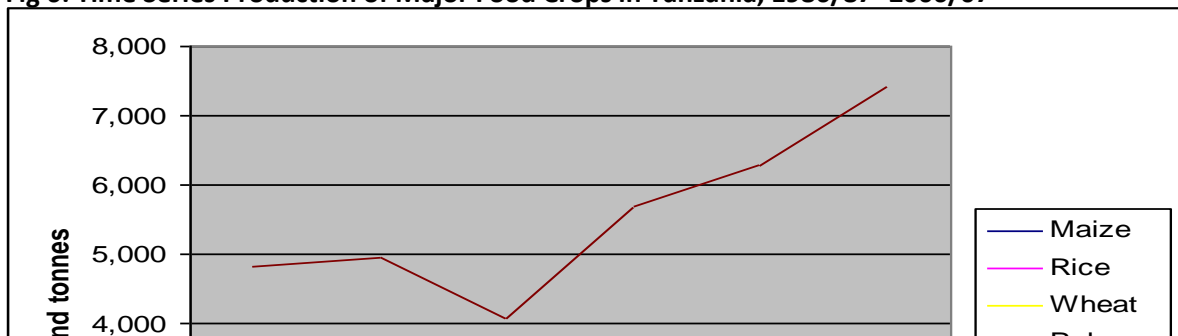
Table 4: Human Development Index: Tanzania Compared with Selected Countries

	HDI (2009)	Rank
Tanzania	0.53	151
Uganda	0.514	157
Kenya	0.541	147
Sudan	0.531	150
Rwanda	0.46	167
Niger (The last one)	0.34	182

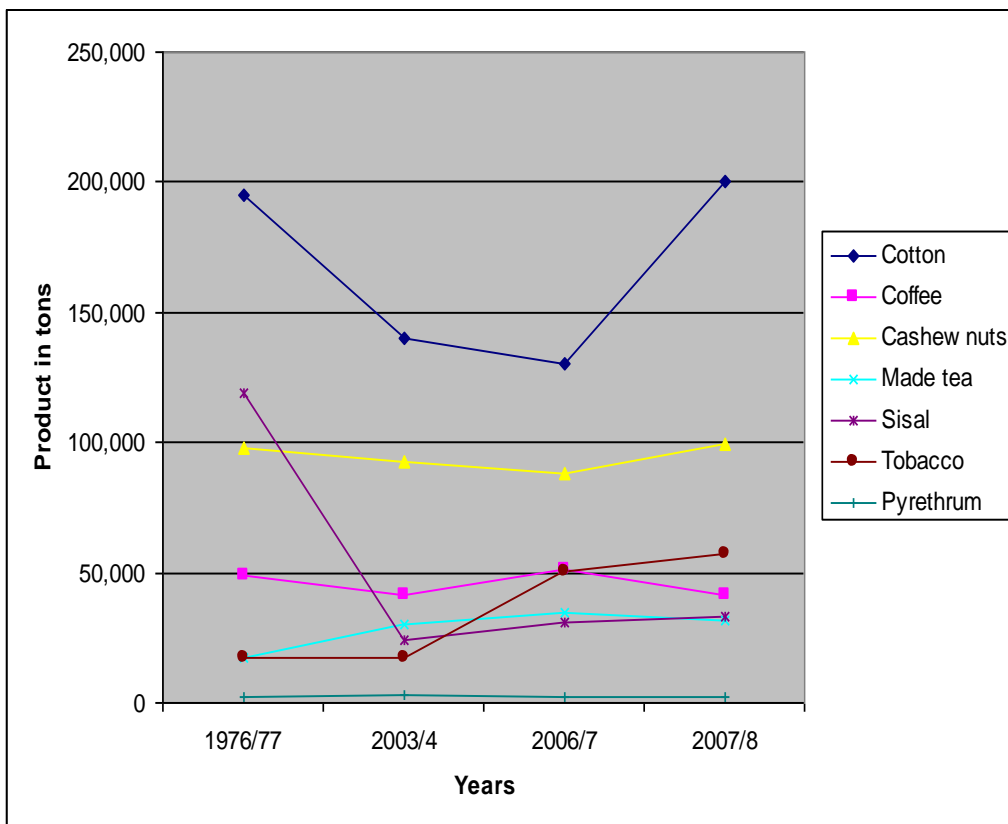
Source HDI 2007

3.4 Given the high dependency of the people in agriculture for their livelihood; the low progress in poverty reduction over the years can be explained by the stagnation and decline in agricultural production and productivity in most of Sub-Saharan Africa (Figure 5) In the case of Tanzania the situation is very similar as can be seen in figures 6 and 7.

Fig 6: Time Series Production of Major Food Crops in Tanzania, 1986/87 -2006/07





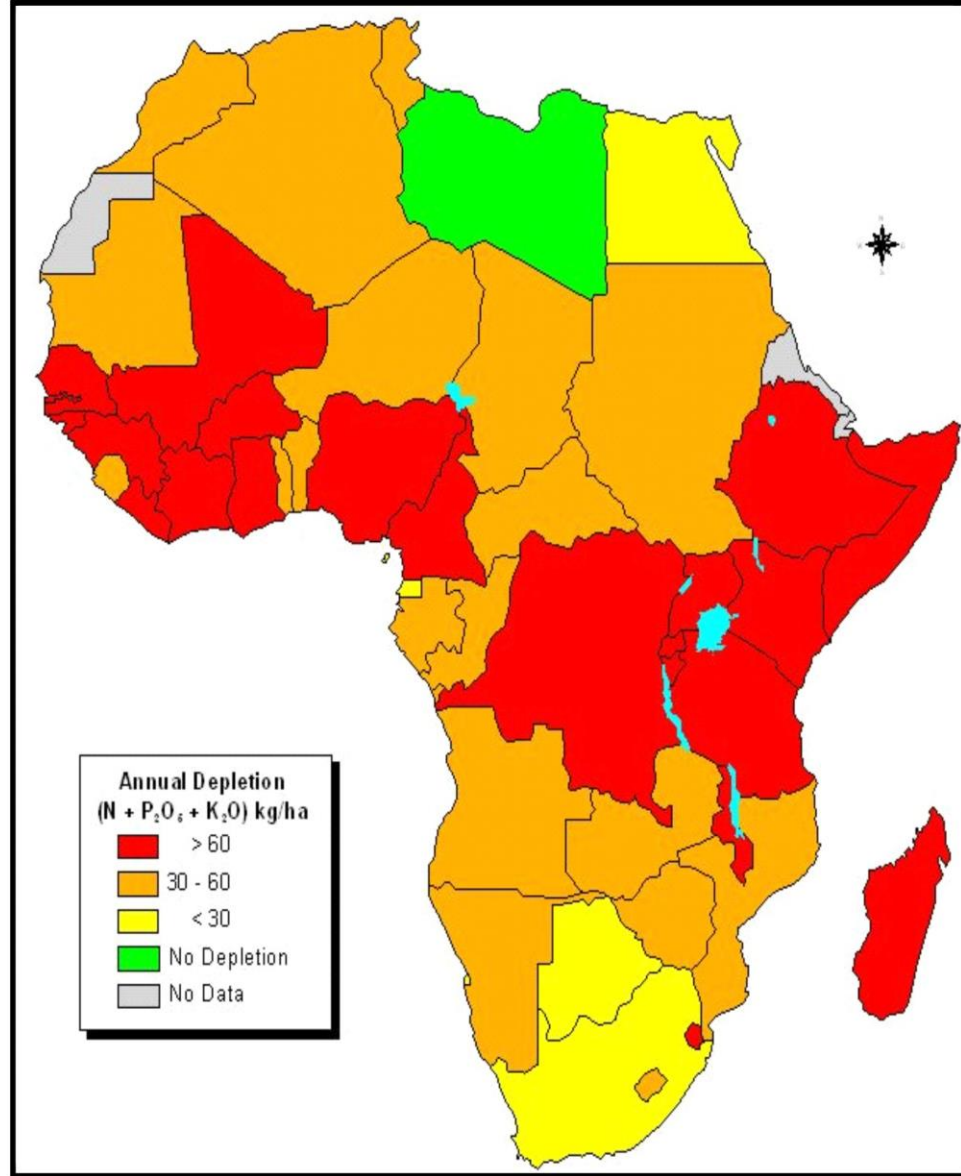


While the performance of agriculture in sub Saharan African, including Tanzania is rainfall dependent; a recent report by the World Bank (WDR 2008) confirm that agriculture can contribute significantly to growth and poverty reduction “if

**governments and donors were to reverse years of policy neglect and remedy their under investment and mis-investment in agriculture”. According to this report, “agriculture and its associated industries are essential to growth and to reducing mass poverty and food insecurity” in the agriculture – based countries. The Abuja Declaration on Fertilizer For The African Green Revolution identifies the action needed to transform and modernize small holder farming in Sub-Saharan African as to “shift from low yielding, extensive land practices to more intensive high – yielding practices with increased use of improved seeds, fertilizers and irrigation”.**

**Figure 8: Nutrient Mining in Agricultural Lands of Africa**

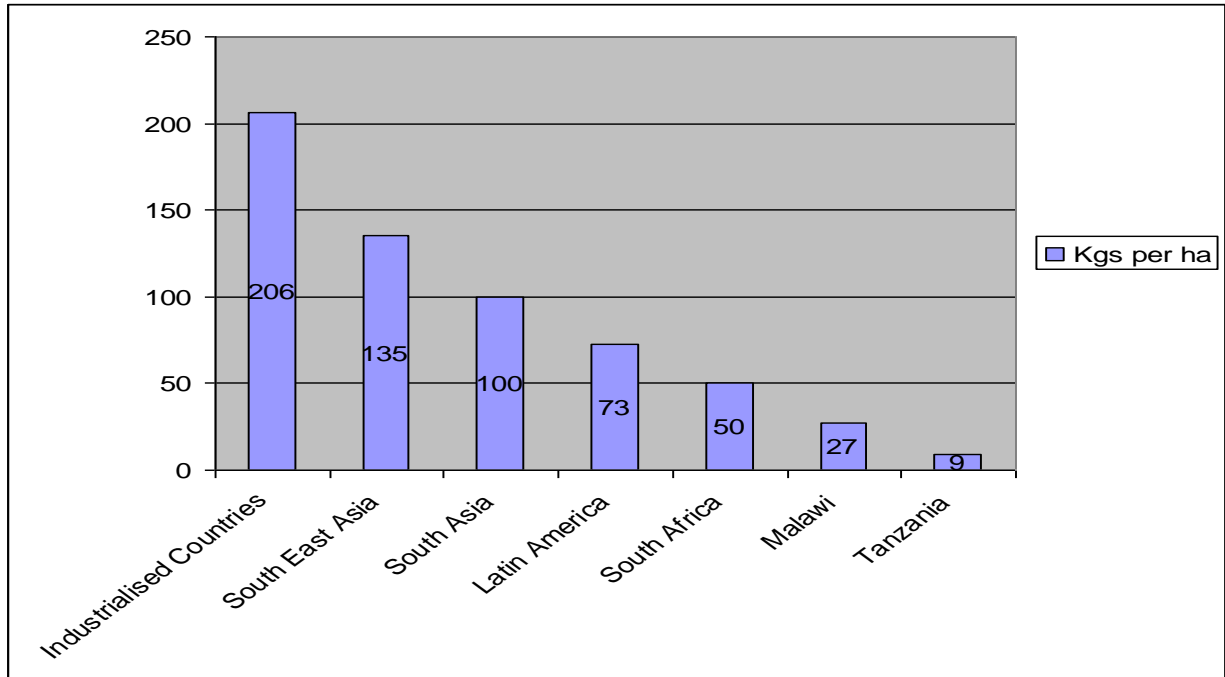
## *Upotevu wa virutubisho vya mimea kwa mwaka katika Afrika*



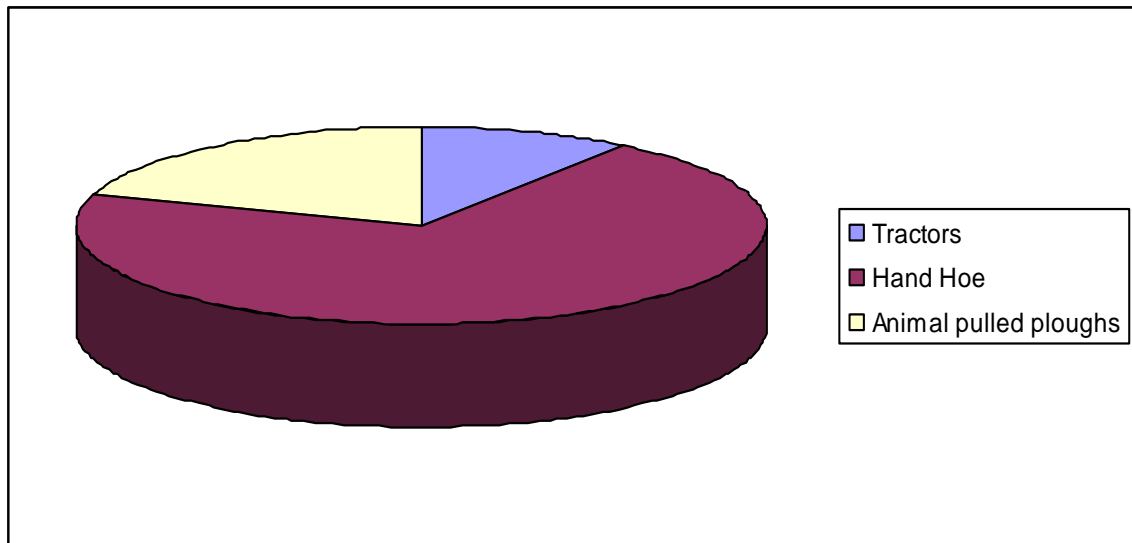
*Chanzo: Abuja Africa Fertilizer Summit, June 2006*

Figures 8 and 9 illustrate the magnitude of the problem of soil fertility depletion in Sub-Saharan Africa; while figure 10 shows the case for Tanzania. The problem of low technology in agricultural practices is aggravated by poor rural infrastructure and access to markets. High reliance on the handhoe (figure 11) is another major constraint to smallholder agriculture in Tanzania as well as lack of favourable agricultural finance (figure 12).

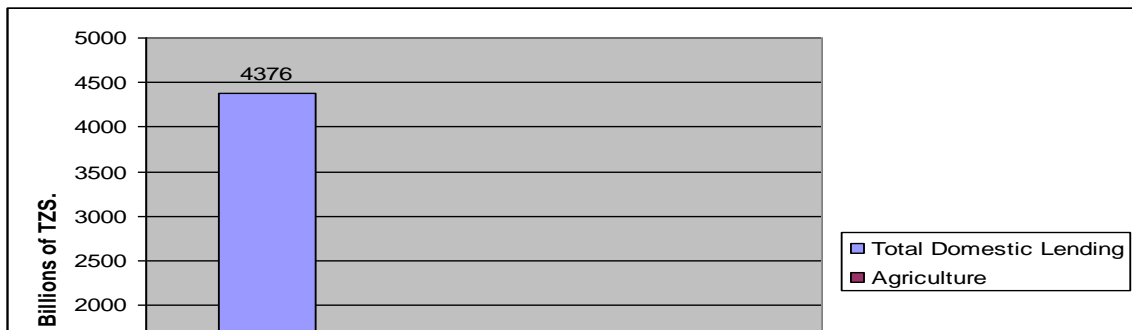
**Figure 10: Quantities of Fertilizers Consumptions in Some Selected Countries Compared with Tanzania**



**Fig: 11 Distribution of Equipment Used In Agriculture in Tanzania**



**Fig. 12: Banks – Domestic Lending from Dec 2004 - 2008 (Billions of Tzs)**



**Table 5: Distribution (percentage) of employed Tanzanians by Industry, 2006**

<b>Industry</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Agriculture/hunting/forestry	70.6	79.7	75.3
Fishing	2.1	0.3	1.2
Mining and Quarrying	0.9	0.1	0.5
Manufacturing	3.4	1.9	2.6
Electricity, gas and water	0.2	0	0.1
Construction	2.1	0.1	1.1
Wholesale and retail	9.3	6.1	7.6
Hotels and restaurant	1.1	2.8	2
Transport/storage and communication	2.9	0.2	1.5
Financial intermediation	0.1	0.1	0.1
Real Estate/renting and business activities	0.8	0.1	0.5
Public administration and defense	1.9	0.3	1.1
Education	1.6	1.2	1.4
Health and social services	0.5	0.7	0.6
Other community/social and personal service activities	1	0.4	0.7
Private households with employed persons	1.5	6.1	3.8

Source: *Integrated Labour Force Survey, 2006-NBS*

#### **4.0 RURAL TRANSFORMATION & THE MACRO-CONTEXT FOR AGRICULTURE**

4.1 Tanzania is endowed with about 44 million hectares of land suitable for agriculture, out of which only 23 percent (10.2 million hectares) are utilized. Out of 29.4 million hectares of land suitable for irrigation, only 289,245 hectares (1 percent)

was under irrigation by the end of 2008. Agriculture sector in Tanzania is dominated by small scale holders who use very poor technologies; and as a result, the sector has exhibited very low productivity and food insecurity.

4.2 Tanzania's comparative advantage lies in agriculture inasmuch as land and labour are both abundant and relatively cheap. However, the sector suffers from unfavourable terms of trade, secular underinvestment, stagnant productivity, low growth, pervasive poverty, and declining export shares. However, the biggest challenge is low productivity.

4.3 Rural transformation is basically agricultural transformation, as nearly all economic activities in rural areas are based in the agricultural sector. Concerted efforts are therefore needed to help reallocate resources into the sector's potential comparative and competitive advantage. The efforts will encompass both the demand and supply side interventions as elaborated in the Kilimo Kwanza pillars.

4.4 It is widely accepted that no country has achieved a significant measure of socio-economic and structural transformation without first modernizing its agriculture, and likewise, efforts to reduce poverty highly depend on the level of productivity in agriculture. The transformation of Tanzania's agriculture must be the foundation of the country's socio-economic development, considering that 80% of Tanzanians depend on agriculture for their livelihood; the country must achieve food self sufficiency for its continued stability and development, the sector contributes 95% of the food consumed in the country while the required level for food self sufficiency is 120%. Furthermore, the sector contributes 26.7% of the Country's GDP; 30% of total exports; and 65% of raw materials for Tanzanian industries.

4.5 It follows that growth in agriculture tends to be pro-poor; it harnesses poor people's key assets of land and labour, and creates a vibrant economy in rural areas where the majority of poor people live. The importance of agriculture for poverty reduction, however, goes well beyond its direct impact on rural incomes. Agricultural growth, particularly through increased agricultural sector productivity, also reduces poverty by lowering and stabilizing food prices, improving employment for poor rural people; increasing demand for consumer goods and services, and stimulating growth in the non-farm economy. According to the WDR 2008 "Agriculture can work in concert with other sectors to produce faster growth, reduce poverty and sustain the environment". A positive process of economic transformation and diversification of both livelihoods and national economies is the key to sustained poverty reduction. But it is agricultural growth that will enable the country and ultimately poor households to take the first steps in this process.

## 5.0 WHY KILIMO KWANZA?

The following major factors underscore the need for KILIMO KWANZA:

- (i) Tanzania is endowed with unique potential:** about 44 million hectares of land suitable for agriculture, out of which only 23 percent (10.2 million hectares) are utilized. Out of 29.4 million hectares of land suitable for irrigation, only 289,245 hectares (1 percent) was under irrigation by the end of 2008. Tanzania has 62,000 sq. kms of the fresh water resources available for crops, livestock and fish farming which is grossly underutilized. In addition, Tanzania has 19 million cattle, 17 million sheep and goats, 30 million chickens which are not commercially exploited. Also, Tanzania has 1424 kms of coastline and 223,000 sq. kms of Tanzania's Exclusive Economic Zone of the Indian Ocean which is not being effectively exploited.
- (ii)** Wide recognition of the unique power of agriculture to spur growth, overcome poverty and enhance food security in agriculture based economies (WDR 2008, MDG Africa Steering Group, AU – CAADP).
- (iii)** Tanzanians themselves support the initiative of agricultural transformation as an important foundation for poverty eradication. A National Economic Empowerment Dialogue that was conducted jointly by TNBC and National Economic Empowerment Council countrywide involved all stakeholders from the District level in 2008. The dialogue overwhelmingly endorsed agriculture as most effective empowerment tool whose success would transform the economic wellbeing of the majority of Tanzanians
- (iv)** Response to recent global economic and food crises.
- (v)** The Kilimo Kwanza will bring more players, robust involvement of private sector and national coordination of planning and resource allocation. It will therefore accelerate achievement of ASDP objectives of enabling farmers to have better access to and use of agricultural knowledge, technologies, marketing systems and infrastructure, all of which contribute to high productivity, profitability and farm incomes; and promoting private investment based on improved regulatory and policy environment.
- (vi)** To implement the Kilimo Kwanza pillars, all MDAs have translated the pillars into implementable action plans under their jurisdiction. The major point to emphasize here is that there is full commitment in KILIMO KWANZA at all levels.

## **6.0 KILIMO KWANZA AS A KEY STRATEGY FOR POVERTY REDUCTION**

6.1 KILIMO KWANZA recognizes the central role of the agricultural sector in Tanzania in bringing about social and economic development and in particular poverty reduction. Unlike past initiatives KILIMO KWANZA takes a holistic approach constituted in the ten pillars and is private sector driven.

6.2 KILIMO KWANZA is a catalyst for implementation of ASDP and accelerates implementation and achievement of MDGs and MKUKUTA targets and objectives, with a strong emphasis on pro-poor growth. Furthermore, it provides national coordination of resources, planning and accountability for implementation of agricultural transformation and enhances strong private sector participation as a key agent towards realization of goals. It comprises a holistic set of policy instruments and strategic interventions towards addressing the various sectoral challenges and taking advantage of the numerous opportunities to modernize and commercialize agriculture in Tanzania. (See Annexed Boxes for DPs views).

## **7.0 AGRICULTURAL SECTOR DEVELOPMENT PROGRAMME (ASDP)**

In 2006/07 the Government launched the first nationwide Agricultural Sector Development Programme after a deep and broad based consultative process which resulted in the production of Rural Development Strategy (2002), Agricultural Sector Development Strategy (2001), and finally the ASDP (2006). Before the launching of the ASDP; developments initiatives in the agricultural sector were predominantly characterized by fragmented projects. About 75 of the funded projects (DADPs) under the programme are planned and implemented by the Local Government Authorities. So in addition to enhancing the D by D policy, the programme also provides a very effective forum and process for coordination and consultation on agricultural development issues.

The programme which is estimated to cost about TZS. 2.5 trl over a seven year period has been underfunded since its inception. Since implementation of the programme commenced in 2006/07; TZS.198.6 bln. have been allocated (34.42%) compared to the requirement of TZS.578.6 bln. In spite of the problems of underfunding implementation of the programme is rated satisfactory and commendable progress has been made both at the local and the national levels in areas of capacity building, research, training, infrastructure rehabilitation, irrigation, market facilities and private sector promotion and participation.



## **8.0 FISCAL SPACE FOR KILIMO KWANZA**

8.1 Considerable fiscal space will be needed to ensure agricultural transformation in Tanzania. One of the key to success for KILIMO KWANZA lies in mobilizing sufficient fiscal resources. Implementation of among others, scaling up the agriculture budget to at least 10 percent of the total budget, re orientation of MDAs activities, private sector investments and increased development partners support for agriculture will be fundamental. Furthermore, difficult fiscal, policy and prioritization choices will have to be made in order to make the public expenditure programme KILIMO KWANZA driven considering that currently the share of the budget for agriculture is only 7% (2009/10) of the Government budget. Furthermore, faster progress will have to be made in improving the investment climate.

## **9.0 CONCLUSION AND WAY FORWARD**

There is ample empirical evidence that, in the case of agriculture-based economies, agricultural transformation is the key for broad economic growth, reduction of mass poverty and food insecurity. The perverse relationship of high economic growth and slow progress in poverty reduction recorded in Tanzania in recent years attests to this. Transformation and modernization of agriculture under the resolution of KILIMO KWANZA will require re-engineering of policies, priorities and strategies to overcome decades of under investment in the sector. This will have to be done if Tanzania is to overcome mass poverty. To achieve this requires involvement of all the stakeholders.

## ANNEXED BOXES FOR DEVELOPMENT PARTNER'S VIEWS

### *Development partner recommended topic for policy dialogue:*

#### **Box 1: Demand-side Policies for Pro-Poor Growth: Markets**

- Motivating farmers, small, medium, and large to expand output is an overarching aim of agricultural policy, and the demand side reforms hold the key. Kilimo Kwanza emphasizes the importance of private sector participation. Basic incentives are best provided by market prices. Terms of trade for agriculture in Tanzania exhibited movements in line with overall inflation in the last ten years, but showed a substantial deterioration vis-à-vis the leading sectors such as mining, tourism, and construction. The bulk of private investment was made in the latter sectors in response to favourable terms of trade while private investment in agriculture languished with low returns and low incentives.

#### **GDP Deflator by Sector**

(Growth rates during 1997-2006 in percent)

Agriculture	113
Forestry and hunting	187
Mining	543
Manufacturing	42
Utilities	67
Construction	132
Trade, restaurants, hotels	29
Transport, Communication	37
Financial, business services	93

Public administration	47
GDP at factor cost	86

Source: Bank of Tanzania Annual Report, 2006/7

- Moreover, the pass through ratio of external market prices (farm gate prices relative to export market prices) to producers is substantially lower in Tanzania than the neighbouring countries, and shows considerable variations over time. The low pass through and low farm gate prices reflects a number of factors such as local taxes, transport costs, inefficient trading systems permitting monopolistic behaviour and rent seeking activities on the part of traders, cooperative societies, and cooperative unions.

#### **Farm Gate to Export Price Ratio by Crop**

(In percent)

Coffee	55 (1989-93)	47 (1994-2005)
Cashew	65 (1990s)	45 (2007-8)

Sources: Case Studies on Coffee (Mahdi) and Cashew (World Bank)

- All in all, low producer prices give rise to thin profit margins especially for small holder farmers, providing little incentives for productivity increases and making agricultural production in Tanzania very vulnerable to changes in input prices and labour costs.<sup>1</sup> A substantial improvement in the price incentives for agricultural products is an indispensable intermediate objective of a successful Kilimo Kwanza.
- A value chain analysis on maize shows that seeds and fertilizers account for the largest shares in the cost of production and the profit margin is very thin especially for small holding farmers. The fluctuations in the cost of imported inputs in 2008 must have wiped out the profit margins all together for many maize producers, forcing them to discontinue use of imported seeds and fertilizers. The recently introduced input subsidy schemes for maize and rice help reduce production costs, but not sufficiently to induce a strong supply response on a sustained basis.
- A World Bank case study on Tanzania's cashew market shows the present farm gate to export price ratio is 45 percent compared with an average of 65 percent during the 1990s when incentives were better for farmers and production

<sup>1</sup> See "Integrated Value Chain Analysis on Maize, Cotton-Textiles, and Tourism," JICA, October 2008

expanded rapidly. Much of the decline is attributable to a new market structure under the warehouse receipt system introduced in 2007 where farmers sell exclusively to primary cooperative societies which excludes the competition from private traders and processors. The Cooperative Union sells cashew through an auction representing the farmers, presumably fetching the best prices for farmers, but the farm gate prices have not risen despite a boom in the external cashew market, with the Cooperative Union and primary societies pre-empting a large share of the revenues. The auction processes and results are not transparent, and the books of the Cooperative Union and primary societies are closed to public scrutiny. A more transparent and competitive marketing system needs to be put in place to improve farm gate prices consistent with the external market prices.

- Actions are urgently required of the Government to address each of those components that drive a wedge between consumer and market prices and diminish farmers profit margins, namely domestic market development of seeds, fertilizers, insecticides, and other inputs, scaled up and innovative investments in rural road maintenance and development, and reforms of the marketing and regulatory systems with a view to introducing more competition and reducing monopolistic and rent seeking activities by traders, cooperatives, and local government agencies and officials.

#### *Taxes*

- Studies on rural taxes have identified significant problems on the administration of the produce cess and related local taxes. As the enforcement of the produce tax involved the transportation in one way or the other, it imposed restrictions on the free movement of agricultural produce, and additional tax-like costs.
- As a result of these observations, it is suggested in the short term to reduce the overall taxes on agriculture to below 10%. In the medium and short term it suggests changing the produce cess either to a land tax or even a sales tax. In the meantime, the limited implied loss in overall LGA revenues could be covered though enhanced central government transfers. There are winners and losers in such a policy, but it is hoped that these changes would considerably reduce barriers to marketing for agricultural produce and lower compliance costs for all participants in the agricultural sector even while providing revenue for the local government.
- There is only weak rationale for exempting taxation for commercial agriculture. As it is a profitable activity, carried out with large amounts of capital, it

should not be given advantages over other sectors in the economy, as this could create incentives for highly inefficient private operations, and cover up for tax evasion.

***Development partner recommended topic for policy dialogue:***

**Box 2: Demand-side Policies for Pro-Poor Growth: Incentives**

- Fiscal incentives can be a useful policy instrument if used properly. The overall experience with incentives has not been positive, as they tend to create large economic distortions that breed economic inefficiency and stagnation, create large fiscal costs that are not justified by their social returns, create powerful political vested interested that make their reforms difficult, and last because they tend to be captured by those who need the least. In view of these recurrent problems, governments have moved towards “smart subsidies”, which try to limit the negative effects, while they have clear objectives in terms of the expected positive impact.

A number of criteria define smart subsidies /fiscal incentives:

- The cause of the problem the subsidy is supposed to resolve should be fully understood, and the subsidy should be targeted at addressing in a time-bound manner the cause of the problem, rather than just mitigating the financial consequences of the problem. In that respect, smart subsidies should have a sunset clause.
- Subsidies should be consistent with the creation of sustainable private-sector market systems.
- Subsidies should not be universal but targeted. The targeting system should be based on transparent eligibility criteria, and effective selection mechanisms, as to reduce mis-targeting and leakage.
- The economic return of fiscal incentives and subsidies should always be compared with the return of public investment in public goods.
- The fiscal incentives and subsidies have to be allocated in the most transparent way possible and in a manner that prevents capture by politically influential lobbies. Conflict of interest rules need to be applied stringently.

***Development partner recommended topic for policy dialogue:***

**Box 3: Supply-side Policies for Pro-Poor Growth**

- Despite all these resources, Tanzania is only able to irrigate 1% of its potential irrigable land of 29.4 million hectares, which include 2.3 million hectares of high potential land and 4.8 million hectares of medium potential. At the same time, because of limited surface water resources during the dry season, a significant number of gravity surface irrigation schemes remain idle for 7 months of the year, and the crop intensification potential inherent in irrigated agriculture is not fully exploited. Preliminary data suggests that approximately 94% of all irrigated land in Tanzania is served by river-intake-canal-surface application type of gravity systems, while the remainder is based on water lifting devices serving gravity canals or pressurized irrigation (sprinkler and micro-irrigation).
- Costs for the development of surface irrigation development in Tanzania vary in that they depend on numerous factors (scale, complexity of intake structure, lined or unlined canals, soil type and climate, topography), but are generally in the range of 4,000-5,000 US\$ per hectare. Therefore, large surface irrigation schemes to cover around 1 million hectares would cost between 4 and 5 billion US\$, which appears large given the size of the agriculture sector budget of around US\$ 360 million in FY2009/10.
- Investment costs for pumped and pressurized irrigation depend on the pumping requirements (difference between level of the water resource and the pressure at the point of discharge), the size of the system, and whether it is solid set or moveable. The latter requires higher labour costs.
- At the low end of investment costs are treadle pumps, retailing for 650US\$ per hectare, incl. all pipes and 5 sprinklers. It does however require 2 operators per hectare, pumping 6-7 hours per day.
- Given the much lower cost, small-scale based pump irrigation is an option that should be explored very actively. Groundwater offers a number of distinct advantages over surface water resources: (1) it is dependable and available year-around and fluctuates much less than surface water sources, (2) it is usually of good quality with minimal silt content and does not require extensive treatment before use, (3) it occurs virtually at the point of use, and as such does not require conveyance from a distant point through extensive canals or pipes, (4) it is suitable for individual, on-demand irrigation, (5) farmers who extract it by their own labour (human powered pumps) or

payment of electricity bills (electrical pumps) appreciate it as a highly valuable input into their growing system, and therefore prefer to use more efficient irrigation methods. It seems that rural water supply engineers have internalized the key advantages groundwater is offering and are acting upon them. Unfortunately, this discourse has been largely absent from the development agenda of most farmers as well as irrigation and agricultural engineers and district staff, who still seem to almost exclusively focus on river-gravity intake-canal-flood type of communal irrigation schemes.