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Q3 2016
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# TANZANIA
## AGRIBUSINESS REPORT

INCLUDES 5-YEAR FORECASTS TO 2020

Published by:BMI Research

# Tanzania Agribusiness Report Q3 2016

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## Part of BMI's Industry Report & Forecasts Series

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# BMI Industry View

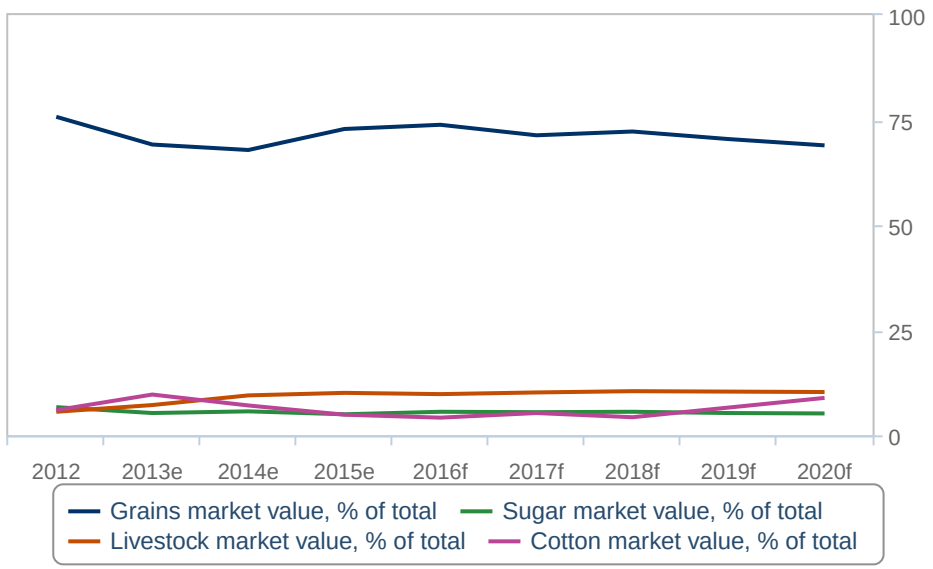
***BMI View:*** *The Tanzanian coffee industry will struggle over the medium term, but renewed government support for the sector has provided hope that it can recover over the longer term. The corn industry, meanwhile, will continue to benefit from solid demand from domestic and export markets, while rising income levels will stimulate rice consumption. The Tanzanian sugar sector will see limited production growth in the next few years, largely due to low sugar prices and the fact that Tanzania scores poorly on productivity measures compared to its regional neighbours. As a result, a growing share of the country's growing sugar demand is met by imports.*

**Key Forecasts**

- We have revised upwards our growth forecasts for sugar production out to 2019/20 as the government's plan to raise duty imports on sugar will help protect local factories and slowly reduce the country's dependence on imports. We now forecast sugar production to reach 335,000 tonnes in 2019/20, in line with production levels for 2014/15 level.
- We have revised upwards our growth forecasts for coffee production across the duration of our forecast period to 2019/20 to reach a level of 642,380 60kg bags. Thanks to government support for the sector and the sharp downturn in output in 2013/14 we believe there is plenty of upside potential for growth.
- 2016 real GDP growth: 6.7% y-o-y (down from an estimated 7.1% in 2015)
- 2016 consumer price inflation: 5.6% y-o-y (flat with an estimated 5.6% in 2015)

## Agribusiness Market Value

**BMI Market Value By Commodity (2012-2020)**




*e/f = BMI estimate/forecast. Source: BMI, FAO*

**Latest Updates & Structural Trends**

Corn production will decline in 2015/16, the first of two consecutive years that we are forecasting output to contract. However, strong demand from the domestic and export markets will maintain elevated local prices. Out to 2020, we forecast Tanzania to record growing corn surpluses as rising income levels induce greater consumption of rice and bread at the expense of corn.

We hold a positive outlook for the Tanzanian rice sector. Nevertheless, we hold the opinion that rice farming in Tanzania is largely undertaken by small farmers with basic know-how, very limited infrastructure capabilities and using traditional seed varieties. Rising income levels out to 2020 will stimulate rice consumption at the expense of more basic staples such as corn and cassava.

Tanzania will continue to grow its sugar production marginally but consistently out to 2019/2020, while the government will maintain strong oversight on the sector. Nevertheless, growth will be lacklustre at best and

Tanzania will continue to import sugar from its neighbours to meet its growing level of demand over the next decade.

# SWOT

## Agribusiness

| SWOT Analysis | |
|---|---|
| **Strengths** | ▪ The agricultural sector is vital to national well-being, employing around 80% of the working population, accounting for 60% of exports and contributing to around 40% of the country's GDP.<br>▪ On a national level, Tanzania is generally self sufficient in corn, its most important food crop; several regions frequently produce a surplus of the grain, and the country exports to neighbouring states such as Kenya.<br>▪ Rising disposable incomes and changing consumer habits are helping to fuel growth in domestic consumption.<br>▪ The government has partnered with foreign governments, international organisations and private firms to address the issue of food security and to increase agricultural productivity and the amount of arable land under cultivation.<br>▪ The country lies in a good geographical position and could benefit from increased exports to Asia. This will incentivise production increases for select agricultural crops. |
| **Weaknesses** | ▪ Tanzania's topography and climatic conditions limit cultivated crops to only 4% of the land area.<br>▪ Although the volume of all major crops has increased over the past few years, food security remains a concern, particularly in northern and north-eastern regions.<br>▪ The poor state of the country's infrastructure makes it costly for farmers to transport their products, both for domestic consumption and export.<br>▪ As a sugar producer, Tanzania still has a relatively low yield per hectare compared with other regional producers such as Kenya and South Africa. |

**SWOT Analysis - Continued**

- A lack of access to credit remains a problem for farmers, reducing their ability to invest in equipment, seeds, pesticides and fertilisers that would otherwise improve harvests.
- Significant depreciation of the Tanzanian shilling, especially over the last six months, will weigh on imports of agricultural inputs such as fertiliser.

**Opportunities**

- Through its Agricultural Sector Development Programme, which is backed by international donors, the government is implementing a food security project; this has potential to significantly raise the quality and yield of major food crops over the next few years.
- Progress with strategies aimed at improving food security and increasing food surpluses has the potential to expand Tanzania's current position as a regional exporter of grains.
- The government is negotiating the possibility of leasing land to foreign companies hoping to grow rice in Tanzania that can then be shipped to their home markets. Deals such as these have potential to generate income for the government, as well as employment for locals.
- Currency depreciation will benefit exports of agricultural produce, such as coffee.
- Collaboration with, and investment from Japan with the intended aim of growing Tanzanian rice output.

**Threats**

- Increased production surpluses in key Asian nations could reduce Tanzania's opportunities to supply these countries.
- A forecast weak currency (against the US dollar) over the next few years will make imports and agricultural inputs more expensive.
- Although increased investment in biofuel crops could lift industry investment, it could also serve to undermine the availability of food crops such as rice.
- Urban migration is increasing; this has potential to reduce Tanzania's rural workforce, as well as the age and output of the average rural worker.

**SWOT Analysis - Continued**

- The illegal duty-free importation of rice from Thailand and Pakistan could potentially add volatility to prices, thus adding an extra dimension of uncertainty.

# Industry Forecast

## Coffee Outlook

***BMI View:*** *We have revised upwards our growth forecasts for coffee production owing to government support for the sector and the downturn in output from 2013 onwards leaving plenty of upside potential for growth. Meanwhile, we have revised down coffee consumption levels in Tanzania over our forecast period out to 2020.*

### Latest Updates

- We have revised downward the growth trajectory of our consumption forecasts as we believe an increasing share of the Tanzanian coffee crop will be exported overseas.
- We have revised upwards our growth forecasts for coffee production across the duration of our forecast period to 2019/20. Thanks to government support for the sector and the sharp downturn in output in 2013/14, we believe there is plenty of upside potential for growth.

**Table: Tanzania - Coffee Production & Consumption Outlook**

| | Average growth forecast, 2015/16-2019/20 | Drivers |
|---|---|---|
| Production | 3.5% | We have revised our forecasts upwards this quarter as we believe the Tanzanian coffee sector, while still constrained by low yields, inferior quality and recurring smuggling, will see growth in output thanks to a renewed push from the government and a strong export market. |
| Consumption | 1.5% | While Tanzania produces a large amount of coffee, this is mainly for export, and domestic consumption of the good is not widespread. Indeed, per capita consumption of coffee is currently at less than 0.1kg per year, as coffee is only consumed by a small amount of the population. We do not expect the consumption of coffee in the country to significantly rise in the immediate future. The Tanzania Coffee Board has begun to explore ways of increasing domestic consumption in order to give the industry a better cushion to protect itself against volatile international prices. An initiative from the Coffee Board will also be affected by rising GDP per capita and changing lifestyle patterns. |
| Trade | | Coffee export is crucial to the Tanzanian economy and the agricultural sector as a whole. We believe subdued Tanzanian coffee yields will pressure export revenue over the next five years. |

*Source: BMI*

**Table: Risks To Outlook**

| Term | Risk |
|---|---|
| Short term | A key upside risk to our coffee production forecast reflects the potential for stronger growth in the global economy. Any significant pickup in global economic growth would increase demand for commodities such as coffee; this would, in turn, boost Tanzanian GDP and generate increased income for the government to invest in the coffee sector. |
| | Conversely, a downside risk to production would result from the increased supply of coffee in global markets. In fact, we are forecasting surpluses in the global market in the coming years. This will prevent another surge in coffee prices and should keep them around current levels or only slightly higher in the near term. This development would very likely have knock-on effects on Tanzania's coffee sector, resulting in lower prices for Tanzanian products. |
| Long term | The sector is also particularly vulnerable to insufficient rainfall and disease/pests. A sharp drought or a disease outbreak would have long-lasting consequences on Tanzanian coffee production due to the vulnerable state of the crop. |

*Source: BMI*

## Structural Trends

**1. Significant Challenges Ahead For Tanzania's Coffee Farmers**

We highlight three key impediments that will constrain growth in Tanzanian coffee production over the next five years. First, Tanzanian coffee yields remain low due to a combination of old trees, limited investment from smallholders and warmer temperatures. More than 90% of Tanzanian output is produced by smallholders, who use coffee as a cash crop but have limited resources to invest in input usage or replanting programs. Additionally, researchers from the International Institute of Tropical Agriculture and the International Center for Tropical Agriculture identified a significant negative impact of steadily rising temperatures on Tanzanian coffee yields. Second, despite arabica being the dominant variety cultivated in Tanzania, the country's production frequently trades at a discount owing to inferior quality. The subsequent lower price received by Tanzanian farmers puts an additional barrier to their ability to invest and improve their crop. Third, smuggling remains an important issue for the sector and exposes farmers to a volatile and unpredictable revenue stream in which they have little to no bargaining power.

**2. Tanzania Want To Promote Local Coffee Consumption**

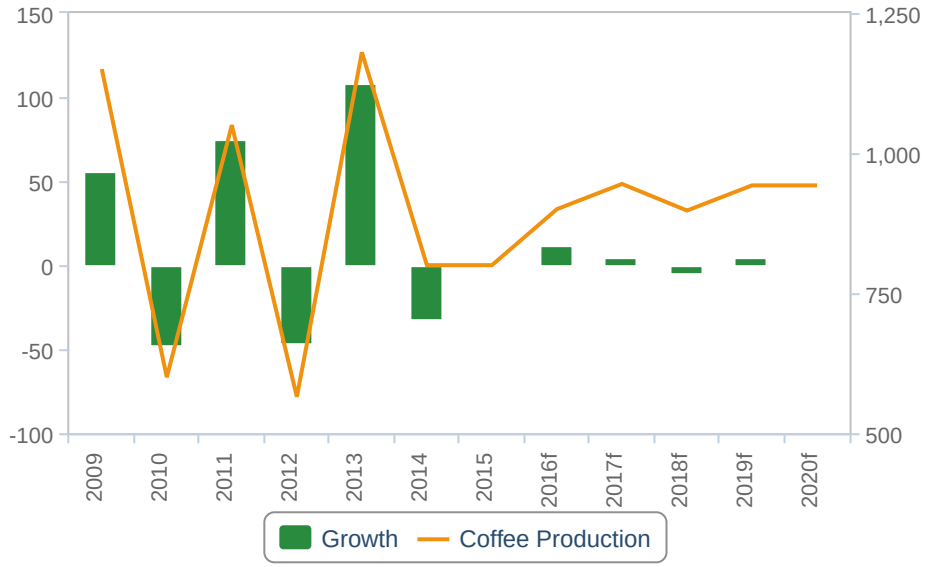
At a time when coffee production in Tanzania has been growing, consumption has remained stagnant and **BMI** is forecasting local coffee consumption in Tanzania to remain flat for the third consecutive year in 2016. Concerned with this growing gap between production and consumption, the Tanzania Coffee Board (TCB) has stepped in to act. The TCB is hoping to promote coffee consumption in the local market to add value to it. At present Tanzania exports a large share of its coffee and the TCB is looking to change this.

### 3. Government Aiming To Double Production By 2021

As Tanzania industrialises, the challenge for the coffee industry is to try and keep up. This would mean increasing the scale of production and the quality of the crop produced for export, if the government's hopes of implementing its strategic growth plan for the sector are to be successful. Back in 2011, and as part of the Agricultural Sector Development Strategy, the government's Coffee Industry Development Strategy was laid out as a ten-year plan to double coffee production in the country by 2021. The government aims to reach this goal by increasing yield in existing farms as well as incentivising the private sector to get more involved with the establishment of new farms

**Poor Yields To Cap Output To 2019/20**

**Tanzania - Coffee Production ('000 60kg bags) & Growth (%, y-o-y)**




*f = BMI forecast. Source: BMI, USDA*

**Table: Coffee Production & Consumption (Tanzania 2012-2020)**

| | 2012 | 2013 | 2014 | 2015 | 2016f | 2017f | 2018f | 2019f | 2020f |
|---|---|---|---|---|---|---|---|---|---|
| Coffee production, '000 60kg bags | 565.0 | 1,180.0 | 800.0 | 800.0 | 900.0 | 945.0 | 897.5 | 942.4 | 942.4 |
| Coffee production, % y-o-y | -46.2 | 108.8 | -32.2 | 0.0 | 12.5 | 5.0 | -5.0 | 5.0 | 0.0 |
| Coffee consumption, '000 60kg bags | 45.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.8 | 51.6 | 52.7 | 53.8 |
| Coffee consumption, % y-o-y | 28.6 | 11.1 | 0.0 | 0.0 | 0.0 | 1.5 | 1.8 | 2.0 | 2.2 |

*f = BMI forecast. Source: BMI, USDA*

# Sugar Outlook

***BMI View:*** *Tanzania will continue to grow its sugar production marginally out to 2019/20, while the government maintains strong oversight on the sector. Meanwhile, even at a time when domestic consumption of sugar is falling, we see Tanzania continuing to import a rising level of sugar to meet its demand over the next decade.*

## Latest Updates

- We have revised upwards our growth forecasts for sugar production out to 2019/20 as the government's plan to raise duty imports on sugar will help protect local factories and slowly reduce the country's dependence on imports. We now forecast sugar production to reach 335,000 tonnes in 2019/20, in line with production levels for 2014/15.
- We have revised downward the growth trajectory of our consumption forecasts out to 2020 due to the government's plan to raise duty imports on sugar putting a dampener on the industry's rise. We now forecast sugar consumption to reach 642,000 tonnes in 2020, 11.3% growth over the 2015 level of 577,000 tonnes.

**Table: Tanzania - Sugar Production & Consumption Outlook**

| | Average growth forecast, 2015/16-2019/20 | Drivers |
|---|---|---|
| Production | 0.0% | We expect sugar production growth in Tanzania to be lacklustre over the coming years. The low international price of sugar will limit production in the country in the short term and will drag on investment into the sector, which will affect output out to 2019/20. Out to 2019/20, sugar prices will remain low by historical standards owing to strong output in major global producers such as Brazil, Thailand and the EU. |
| Consumption | 2.2% | We forecast sugar consumption to continue to post strong - albeit slightly more subdued - growth over our forecast period. Strong consumption growth will continue despite higher domestic sugar prices relative to international prices. Long-term consumption growth will be partly fuelled by a major increase in the Tanzanian population. We also expect a steady rise in the level of disposable income, especially in urban centres. In turn, we also expect rising demand for soft drinks and confectionery. At 10kg per annum, per capita sugar consumption levels still trail behind those of neighbouring Kenya (20kg per annum), for example. Our projected consumption growth rates therefore reflect the considerable scope that exists for further per capita growth. |
| Trade | | Tanzania is a significant importer of sugar and the country relies on imports to meet its domestic demand. We do not believe the country will be able to satisfy domestic consumption with locally sourced sugar. It will continue to rely on imports for the next decade at least, despite the elevated cost of imported sugar for domestic consumers. In order to curb illegal imports that impede growth in domestic production, the government imposes a series of import quotas and taxes. It also plans to support local production by introducing an import duty on sugar, a factor that will weigh on the high levels of growth expected in sugar consumption in Tanzania through to the end of our forecast period. |

*Source: BMI*

**Table: Risks To Outlook**

| Term | Risk |
|---|---|
| Short term | A positive outcome for the government's repeated efforts to stimulate sugar output constitutes an upside risk to our production forecast. The government tries to maintain import tariffs to protect the industry and offers tax incentives to induce production. If the optimistic projections of the Sugar Board of Tanzania were to materialise, resulting in 18 new sugar projects coming on line out to 2020, we would revise our production forecasts upward.<br>With regard to our consumption forecast, it is important to remember that sugar continues to be seen as a luxury good by many Tanzanians, rather than a staple good. As a result, we would expect any negative changes to Tanzania's macroeconomic situation to have potentially negative implications for sugar consumption levels. |
| Long term | One of the greatest upside risks to our production forecast is the potential for a major change in global sugar prices. Currently, global prices are at their lowest level for several years. Should prices begin to rise again, farmers will have greater incentive to produce, which would raise output levels. |
| | An additional upside risk to our outlook is the emergence of a robust biofuels industry in Tanzania. Although much of the debate about biofuels in the country has focused on the use of the crop jatropha to produce biodiesel, it is possible that sugar cane will ultimately be grown to produce bioethanol. |
| | A major downside risk to Tanzanian sugar output is the growing arrival of cheap imported sugar on the domestic market. Tanzanian producers could face the threat of duty-free imports from larger producers in the Southern African Development Community, which the country currently avoids due to a regulation that the government is trying to extend to 2020. |

*Source: BMI*

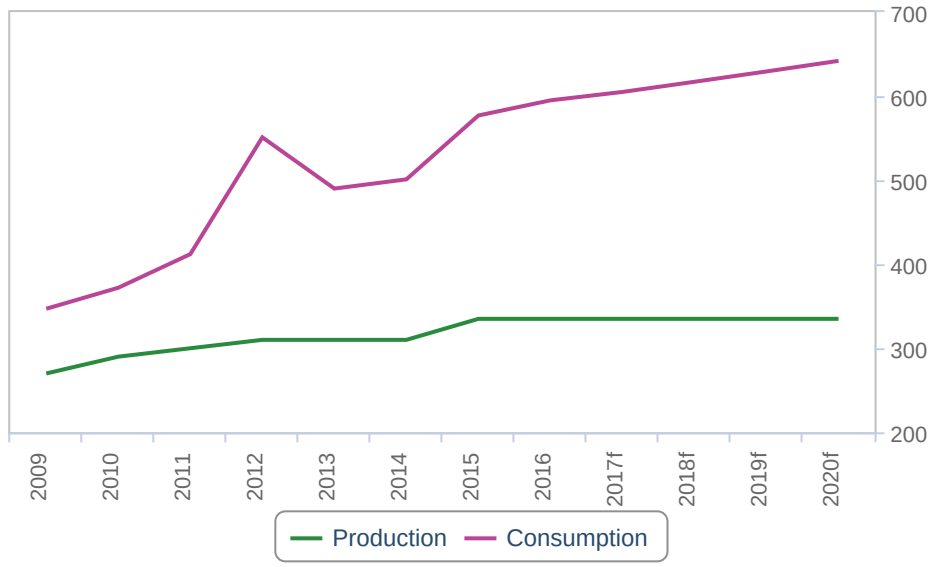
## Structural Trends

### 1. Duty On Imports To Rise Up To 25% Level

The Tanzanian government plays a very active role in the local sugar market and this appears unlikely to change over the remainder of our forecast period. First, the government established a maximum selling price of TZS18,000/kg in March 2016. Second, the Tanzanian government is keen on maintaining its restrictions on sugar imports in a bid to protect domestic production. The government restricts imports through the issuance of import permits and also imposes a 15% refundable duty introduced in 2015. According to the tabling of the 2016/17 national budget in parliament, the Tanzanian government has plans to raise the import duty higher to 25%. The plan to do so will take place in stages, rather than all in one go. The 25% level will be reached during 2018/19.

## Growing Deficits To 2020

**Tanzania - Sugar Production & Consumption ('000 tonnes)**




*f = BMI forecast. Source: USDA, BMI*

**Table: Sugar Production & Consumption (Tanzania 2012-2020)**

| | 2012 | 2013 | 2014 | 2015 | 2016f | 2017f | 2018f | 2019f | 2020f |
|---|---|---|---|---|---|---|---|---|---|
| Sugar production, '000 tonnes | 310.0 | 310.0 | 310.0 | 335.0 | 335.0 | 335.0 | 335.0 | 335.0 | 335.0 |
| Sugar production, % y-o-y | 3.3 | 0.0 | 0.0 | 8.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sugar consumption, '000 tonnes | 551.0 | 490.0 | 501.0 | 577.0 | 595.0 | 605.0 | 617.1 | 629.4 | 642.0 |
| Sugar consumption, % y-o-y | 33.7 | -11.1 | 2.2 | 15.2 | 3.1 | 1.7 | 2.0 | 2.0 | 2.0 |

*f = BMI forecast. Source: BMI, USDA*

# Rice Outlook

***BMI View:*** *We hold a positive outlook for the Tanzanian rice sector. Nevertheless, we hold the opinion that rice farming in Tanzania is largely undertaken by small farmers with only basic know-how, very limited infrastructure capabilities and using traditional seed varieties. Rising income levels out to 2020 will stimulate rice consumption at the expense of more basic staples such as corn and cassava.*

## Latest Updates

- We have revised upward the path of our production forecasts out to 2019/20. While we downgraded our output forecasts during our last quarterly update as farmers' adoption of higher-yielding rice varieties has been limited , and seeds remain expensive to purchase compared with the cost of replanting from existing output, we believe that the detrimental impact of this will be mitigated by improved US Department of Agriculture (USDA) historical data for rice production in Tanzania. As such, we continue to forecast rice output to exceed 2mn tonnes in 2019/20.
- We have revised downward the path of our consumption forecasts out to 2020. While we revised our forecasts up during our last quarterly update owing to the view from our Food & Drink team that rising incomes would translate into growing consumption of rice and bread at the expense of cheaper staples like corn and cassava, the publishing of new and lower historical data for rice consumption in Tanzania from the USDA will dampen this increase. Over our forecast period, we continue to forecast that rice consumption will reach 2.1mn tonnes in 2020.

**Table: Tanzania - Rice Production & Consumption Outlook**

| | Average growth forecast, 2015/16-2019/20 | Drivers |
|---|---|---|
| Production | 3.4% | Over the next few years, Tanzania's rice sector will benefit from the introduction of new, hardier seed varieties. To a certain extent, growth will also be driven by foreign companies that plan to cultivate rice as a food security crop; this rice will subsequently be shipped from Tanzania to the companies' home markets. Despite this, output will remain vulnerable to erratic and insufficient rains for the duration of our forecast period, and there remains a strong possibility that poor rains could negatively affect long-term output. Tanzanian rice production is constrained by the dominant shares of smallholder production and rain-fed crops, as well as the limited usage of improved seeds and fertilisers. This results in Tanzanian rice yields being some of the lowest in East Africa and below the continent's average. Additionally, poor transportation infrastructure limits price discovery and farmers' bargaining power. That said, some companies have entered into the Tanzanian rice sector with a view to immediately export rice. For example, Japanese companies have invested heavily in rice agriculture in the country with the aim of sending part of the resulting output back home. Nevertheless, we do not expect Tanzania to be a significant exporter of rice in the coming years, though we do expect the production deficit to decline by 2020. |
| Consumption | 2.9% | Rice is more prevalent in the diets of high-income consumers in urban areas, partly because it is a more expensive source of calories than corn or cassava. Rising income levels over the forecast period are expected to stimulate increased rice consumption among a wider segment of the population; this will occur as part of a move toward increased diet diversification. |
| Trade | | Despite growing import demand for its aromatic rice, we do not see Tanzania becoming a significant exporter of rice in the next decade. Nevertheless, the deficit is bound to narrow over the course of our forecast period as domestic production will begin to increase and reduce the reliance on imports. |

*Source: BMI*

**Table: Risks To Outlook**

| Term | Risk |
|---|---|
| Short term | A possible risk to our forecast comes from illegally imported rice from Thailand and Pakistan, which is often dumped into the Tanzanian market, further lowering the prices of domestically produced rice. This rice enters the country without duty, often arrives at a time furthest from the harvest and the stocks tend to disappear as harvest season draws near. Such rice naturally leads to price volatility, but at this point the volumes, in our opinion, are not strong enough to have a significant impact on the commodity. |
| Long term | A major upside risk to our production forecast comes in the form of tracts of land being allocated to foreign companies looking to grow rice as a food security crop. Depending on the amount of land and the quality of the cultivation techniques used, rice production could end up being higher than expected, especially in the later years of our forecast period. |
| | An additional upside risk to our production forecast centres on the potential for successfully increasing rice productivity per hectare, as well as the number of hectares under rice cultivation. The government is addressing both issues in collaboration with pan-African research organisation Africa Rice. |
| | One of the main downside risks to both our production and consumption forecasts is the possibility that an increasing amount of land, currently used for rice production, will be handed over to companies looking to invest in biofuel crops, such as jatropha and sugar cane. Such development could not only weaken rice production, but could also have a detrimental impact on rice consumption levels. This could, in turn, increase the country's reliance on rice imports. |

*Source: BMI*

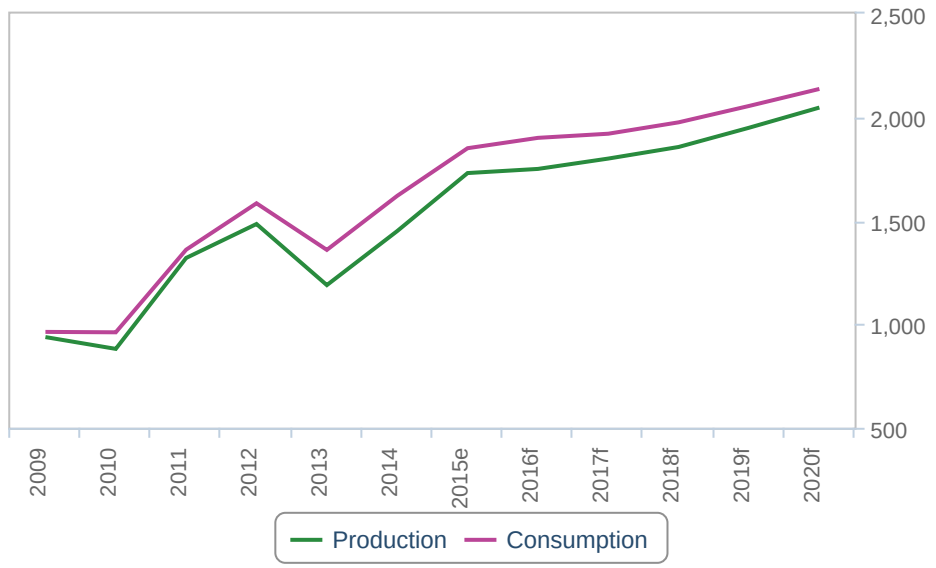
## Structural Trends

### 1. Limited Farmer Uptake Of Improved Rice Varieties

The International Rice Research Institute (IRRI) has created two rice varieties specifically for Tanzania that were released in 2013: Komboka and Tai. Both varieties can yield three times as much as the regular varieties currently used in Tanzania and mature faster, which would enable farmers to grow rice twice a year rather than once. Moreover, the Komboka variety is aromatic rice, which is a distinctive feature of Tanzanian rice production and will help the seeds gain popularity. Nevertheless, the two improved varieties have seen limited demand even two years after their introduction. This is because these seeds are not distributed by wholesalers and farmers are accustomed to use a portion of their harvest for next season's plantings rather than purchase seeds. Moreover, fertiliser usage remains low, which prevents strong gains in output, income and subsequently input purchases. Out to 2020, we believe the use of improved seeds by Tanzanian farmers will grow, concurrently with fertiliser usage, as increased public and private investment focuses on the rice sector.

## Stable Deficits To 2020

**Tanzania - Rice Production & Consumption ('000 tonnes)**




*e/f = BMI estimate/forecast. Source: USDA*

**2. Japan Increases SupportJapan And Tanzania Build Rice Industry Relations**

Tanzania and Japan have begun the process of forging closer relations in the rice sector over the coming year. A USD14.25mn investment from the Japan Policy and Human Resources Development Agency has built the closer ties, with the stated aim of boosting rice production through improving farming access to knowledge as well as resources, such as technology and infrastructure. BMI notes that this is not the first collaboration in the sector between the two nations, however. The African nation's TANRICE project has also received support from the Japanese rice industry in the past.

The Tanzanian government has received USD14.25mn from the Japan Policy and Human Resources Development agency in order to boost rice production in the country in the coming years. The funds will help to support rice production in 20 irrigation schemes from six irrigation zones in Morogoro, Kilimanjaro, Mbeya, Tabora, Centre and Mwanza over three years. The grant will also complement local- and national-level support from the agricultural sector development programme and aims to give farmers better access to education, technologies, marketing systems and infrastructure. In addition, seven Zonal Irrigation and

Technical Services Units will be built with the help of Kilimanjaro Agriculture Training Institute technicians and farmers to increase access to irrigation development knowledge and skills.

This funding comes in addition to expanded support from Japanese experts for Tanzania's TANRICE project, which began in 2007 with the aim of training farmers, improving irrigation provision and introducing new varieties that can be grown in upland areas without irrigation.

**Table: Rice Production & Consumption (Tanzania 2012-2020)**

| | 2012 | 2013 | 2014 | 2015e | 2016f | 2017f | 2018f | 2019f | 2020f |
|---|---|---|---|---|---|---|---|---|---|
| Rice production, '000 tonnes | 1,484.0 | 1,189.0 | 1,450.0 | 1,730.0 | 1,750.0 | 1,800.0 | 1,856.0 | 1,948.8 | 2,046.3 |
| Rice production, % y-o-y | 12.4 | -19.9 | 22.0 | 19.3 | 1.2 | 2.9 | 3.1 | 5.0 | 5.0 |
| Rice consumption, '000 tonnes | 1,584.0 | 1,359.0 | 1,620.0 | 1,850.0 | 1,900.0 | 1,920.0 | 1,975.0 | 2,054.0 | 2,136.2 |
| Rice consumption, % y-o-y | 16.5 | -14.2 | 19.2 | 14.2 | 2.7 | 1.1 | 2.9 | 4.0 | 4.0 |

*e/f = BMI estimate/forecast. Source: BMI, USDA*

# Grains Outlook

***BMI View:*** *Corn production will decline sharply for the second consecutive year in 2016/17, while strong demand from domestic and export markets will maintain elevated local prices. Beginning 2017/18 we expect the fortunes of the rice market to turnaround in terms of both production and consumption, however. Out to 2020, we forecast Tanzania to record growing corn surpluses as rising income levels induce greater consumption of rice and bread at the expense of corn.*

## Latest Updates

- In our last quarterly update we revised downward our 2015/16 corn production forecast as the 'vuli' rains, which occur during Q4, were delayed and erratic, weighing on the 'vuli' corn crop, which is harvested in Q1. The 'vuli' crop accounts for about 30% of the total corn output. We no longer expect the detrimental impact of this slowdown to be as damaging as originally thought, however, and we now forecast corn output to reach a level of 6.0mn tonnes in 2015/16 (revised upward from the last quarter), but still down by 10.9% from a year previously.
- In our last quarterly update we revised downward our 2016 corn consumption forecast, as local corn prices have increased substantially over the past year due to limited availability and strong import demand from neighbouring countries. Moreover, below-average rainfall over Q116 resulted in poor pasture quality, a factor that will translate into increased demand for feed grains by livestock farmers. We forecast 2016 corn consumption to fall by 6.7% y-o-y to 5.6mn tonnes. With increasing number of refugees from Burundi and the Democratic Republic of Congo arriving in Tanzania, we expect consumption demand to return to growth in 2017/18 and to then continue to accelerate through to the end of our forecast period to reach a level of 5.4mn tonnes by the end of 2020.

**Table: Tanzania - Corn Production & Consumption Outlook**

| | Average growth forecast, 2015/16-2019/20 | Drivers |
|---|---|---|
| Production | -1.2% | Out to 2019/20, we do not expect Tanzania to significantly improve its grains output via improved yield growth. We expect output to decline for two consecutive years between 2015/16-2016/17 before slowly recovering some of the ground lost through to the end of or forecast period. We hold a similar view for many other Sub-Saharan African nations. Nevertheless, elevated local corn prices and continued demand from domestic and regional markets will sustain plantings over the next five years. |
| Consumption | -1.7% | Out to 2020, we expect the path of consumption growth to be fraught with complication. A sharp two-year drop off in consumer demand from 2016-2017 will draw the sector down before it can begin to recover in 2018 onwards through to the end of our forecast period. We expect rising incomes to mainly benefit bread and rice consumption at the expense of corn and cassava. Moreover, income levels will not reach the level at which meat consumption becomes common. Therefore, we expect limited corn consumption by the livestock sector. |
| Trade | | We expect Tanzania to record growing corn surpluses over the next five years, conditional on solid production growth. This will translate into growing exports to Kenya, in continuation of the trend already in place, as we forecast Kenya to record growing deficits over the same period. |

*Source: BMI*

**Table: Risks To Outlook**

| Term | Risk |
|---|---|
| Short term | A key upside risk to our production forecast centres on the potential to achieve progress with strategies aimed at improving food security and boosting food surpluses. Longer-term success with such strategies has potential to position Tanzania as a major regional exporter of grains. A decision to introduce genetically modified corn would likely result in significantly higher output of the grain. |
| | A further upside risk for the production of both corn and sorghum comes from the ongoing assistance for farmers envisioned under the government's Agricultural Sector Development Programme. Given their role as staple foodstuffs, the two grains are expected to be at the forefront of any scaled-up government agricultural support. |
| | A key downside risk to our corn consumption forecast stems from the problem of corn being smuggled out of the country and into neighbouring Kenya. If unchecked, this has the potential to drive up the price of corn, which could result in reduced consumption of the grain. |
| | Another risk to our forecast is the substitution of corn for other more resilient sources of food, such as sweet potatoes. Given the harsh climate of Tanzania, the corn crop is continuously at the mercy of drought and severe weather conditions. The orange sweet potato was introduced to Tanzania in 2002 and has proven to be a much better staple food than corn given its ability to withstand climatic volatility. There is a possibility that orange sweet potato could substitute a percentage of the corn given its higher level of nutrition and its ability to grow with ease. |
| Long term | One of the biggest downside risks to our corn production forecast remains the vulnerability of corn harvests to variations in rainfall. Stepped-up investment in drought-resistant forms of corn could yet result in stronger production growth. Although more resistant to the effects of drought, sorghum also faces a downside risk from unreliable rainfall and from other hazards such as Striga infestation. |

*Source: BMI*

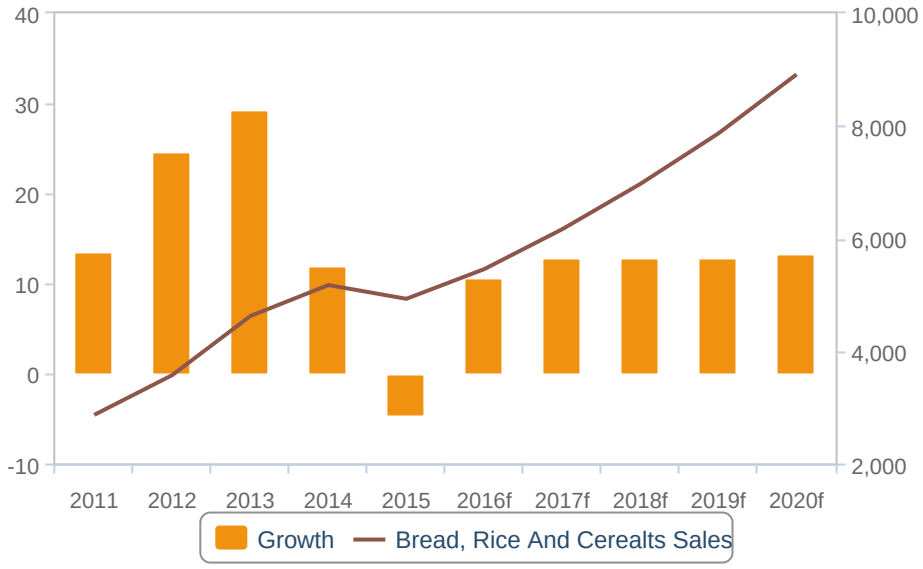
## Structural Trends

### 1. Rising Incomes Will Not Benefit Corn Consumption

Our Food & Drink team forecasts elevated growth in sales of bread, rice and cereals over the next five years (*see 'Economic Recovery Drives Higher Food Consumption', February 17*) as growing income levels induce diversification of diets away from staples such as corn and cassava. On the other hand, income levels will not rise enough to induce growing meat consumption and thus will not translate into rising corn demand by livestock producers.

**Rising Incomes To Benefit Bread, Rice Consumption**

**Tanzania - Bread, Rice & Cereals Sales (USDmn) & Growth (% y-o-y)**




*f = BMI forecast. Source: BMI, national statistics*

**Table: Corn Production & Consumption (Tanzania 2012-2020)**

| | 2012 | 2013 | 2014 | 2015 | 2016f | 2017f | 2018f | 2019f | 2020f |
|---|---|---|---|---|---|---|---|---|---|
| Corn production, '000 tonnes | 4,341.0 | 5,104.0 | 5,356.0 | 6,737.0 | 6,000.0 | 5,500.0 | 5,679.0 | 5,963.0 | 6,261.1 |
| Corn production, % y-o-y | -8.3 | 17.6 | 4.9 | 25.8 | -10.9 | -8.3 | 3.3 | 5.0 | 5.0 |
| Corn consumption, '000 tonnes | 4,200.0 | 5,000.0 | 5,000.0 | 5,950.0 | 5,550.0 | 5,100.0 | 5,148.9 | 5,277.7 | 5,436.0 |
| Corn consumption, % y-o-y | 5.0 | 19.0 | 0.0 | 19.0 | -6.7 | -8.1 | 1.0 | 2.5 | 3.0 |

*f = BMI forecast. Source: BMI, USDA*

# Commodities Price Analysis

## Global - Global Commodities Strategy

**Table: Select Commodities - Performance And Bmi Forecasts**

| Commodity | Unit | Current Price | YTD (% Chg) | 1 Year (% Chg) | 2015 (ave) | YTD (ave) | 2016f (ave) | 2017f (ave) |
|---|---|---|---|---|---|---|---|---|
| **Agriculture** | | | | | | | | |
| Class III Milk (Third-Month) | USD/cwt | 16.15 | 13.9 | -6.1 | 15.75 | 13.75 | 13.30 | 14.50 |
| Cocoa (London) | GBP/tonne | 2,328 | 2.9 | 8.4 | 2,098 | 2,171 | 2,000 | 1,900 |
| Coffee | USc/lb | 140 | 10.2 | 8.0 | 132 | 122 | 125 | 130 |
| Corn | USc/bushel | 428 | 19.2 | 20.8 | 377 | 376 | 380 | 410 |
| Cotton | USc/lb | 63 | 0.2 | -1.6 | 63.3 | 60.9 | 63.0 | 66.0 |
| Feeder Cattle | USc/lb | 140 | -16.0 | -37.4 | 202.3 | 153.8 | na | na |
| Lean Hogs | USc/lb | 87 | 45.2 | 12.5 | 69 | 71.6 | na | na |
| Live Cattle | USc/lb | 117 | -13.6 | -22.9 | 146 | 130.0 | na | na |
| Palm Oil (Third-Month) | MYR/tonne | 2,416 | -2.8 | 5.5 | 2,235 | 2,583 | 2,500 | 2,350 |
| Rough Rice | USD/cwt | 12 | 1.0 | 19.2 | 11.1 | 10.8 | 11.8 | 11.8 |
| Soybean | USc/bushel | 1,147 | 31.6 | 19.7 | 945 | 956 | 975 | 1,000 |
| Sugar #11 | USc/lb | 20 | 31.7 | 77.5 | 13.1 | 15.41 | 16.00 | 16.40 |
| Wheat | USc/bushel | 477 | 1.5 | -2.4 | 507 | 469 | 500 | 495 |
| **Energy** | | | | | | | | |
| Coal, Thermal (Newcastle) | USD/tonne | 52.5 | 3.7 | -13.0 | 62.1 | 50.9 | 51.0 | 52.0 |
| Brent Crude | USD/bbl | 48.3 | 29.5 | -24.2 | 53.6 | 40.5 | 46.5 | 57.0 |
| OPEC Basket, Oil | USD/bbl | 45.4 | 45.1 | -24.6 | 49.5 | 35.5 | 43.5 | 54.0 |
| WTI Crude | USD/bbl | 47.3 | 27.8 | -21.1 | 48.8 | 39.0 | 46.0 | 57.0 |
| Natural Gas (HH) | USD/mnBtu | 2.6 | 9.9 | -11.3 | 2.63 | 2.06 | 2.30 | 2.80 |
| Natural Gas (NBP) | USD/mnBtu | 4.8 | -2.9 | -28.6 | 6.49 | 4.29 | 4.00 | 4.35 |
| JKM LNG | USD/mnBtu | 4.9 | -28.0 | -35.1 | 7.47 | 4.79 | 4.50 | 3.90 |
| **Metals** | | | | | | | | |
| Aluminium | USD/tonne | 1,626 | 7.9 | -5.3 | 1,681 | 1,542 | 1,600 | 1,625 |
| Copper | USD/tonne | 4,640 | -1.4 | -20.2 | 5,493 | 4,698 | 4,900 | 5,000 |
| Gold | USD/oz | 1,304 | 22.9 | 10.3 | 1,160 | 1,216 | 1,275 | 1,350 |
| Iron Ore (62% CFR, Qingdao) | USD/tonne | 51 | 16.3 | -21.2 | 55.5 | 52 | 48 | 43 |
| Lead | USD/tonne | 1,697 | -5.4 | -6.9 | 1,794 | 1,733 | 1,750 | 1,800 |
| Nickel | USD/tonne | 9,045 | 2.6 | -30.2 | 11,877 | 8,659 | 9,000 | 10,500 |
| Palladium | USD/oz | 539 | -4.1 | -26.4 | 690 | 547 | na | na |

**Select Commodities - Performance And Bmi Forecasts - Continued**

| Commodity | Unit | Current Price | YTD (% Chg) | 1 Year (% Chg) | 2015 (ave) | YTD (ave) | 2016f (ave) | 2017f (ave) |
|---|---|---|---|---|---|---|---|---|
| Platinum | USD/oz | 986 | 10.5 | -8.7 | 1,054 | 962 | na | na |
| Silver | USD/oz | 18 | 28.4 | 11.0 | 15.7 | 16 | na | na |
| China Domestic Hot Rolled Steel Average | CNY/tonne | 2,559 | 28.3 | 9.5 | 2,244 | 2,455 | na | na |
| Tin | USD/tonne | 16,975 | 16.6 | 14.7 | 16,029 | 16,057 | 16,500 | 17,500 |
| Zinc | USD/tonne | 2,037 | 26.6 | -3.2 | 1,938 | 1,784 | 1,900 | 2,050 |

*Note: All metal prices except steel and iron ore refer to generic third-month contracts; all energy and agricultural prices refer to generic front-month unless otherwise stated; performances as of June 16 2016. Source: Bloomberg, BMI*

# Upstream Analysis

## Africa Machinery Outlook

***BMI View:*** *Agricultural machinery sales will be particularly poor in SSA over the coming quarters due to weak domestic currencies and lower farm incomes despite sharp increases in grains prices. Over the next five years, we believe South Africa and North African countries will remain the key markets for agricultural machinery companies in Africa. The dependence of African farmers on support from governments and multinationals will keep future prospects contingent on wider economic development in the continent.*

**Starting From A Low Base**

The agricultural mechanisation rate in Africa is the lowest in the world. According to the Food and Agriculture Organization (FAO) and the European Agricultural Machinery Association (CEMA), 65% of land preparation is done by humans in Sub-Saharan Africa (SSA) against 40% in East Asia, 30% in South Asia and 25% in Latin America and the Caribbean. South Africa, Morocco and Tunisia dominate Africa's new tractor sales market, taking almost half of the continent's total sales per year. However, more than 80% of these are light machinery of less than 100 horsepower and are two-wheel drive. In another example, Algeria counted 140 tractors per 100sq km of arable land in 2008, compared with 271 in the US and fewer than 6.6 in Nigeria.

**Table: How Africa Compares With Other Regions**

| Region | Cereal yield (kg/ha) | Fertiliser use (kg/ha) | Irrigation, % of arable land | Tractors per 1,000ha |
|---|---|---|---|---|
| Africa | 1,040 | 13 | 5 | 28 |
| Select comparable countries | 3,348 | 208 | 38 | 241 |

*Note: Africa excludes Egypt and Mauritania. Select countries are: Bangladesh, Brazil, China, India, South Korea, Pakistan, the Philippines, Thailand and Vietnam. Source: The World Bank (2007)*

**Weak Sales Over Coming Quarters**

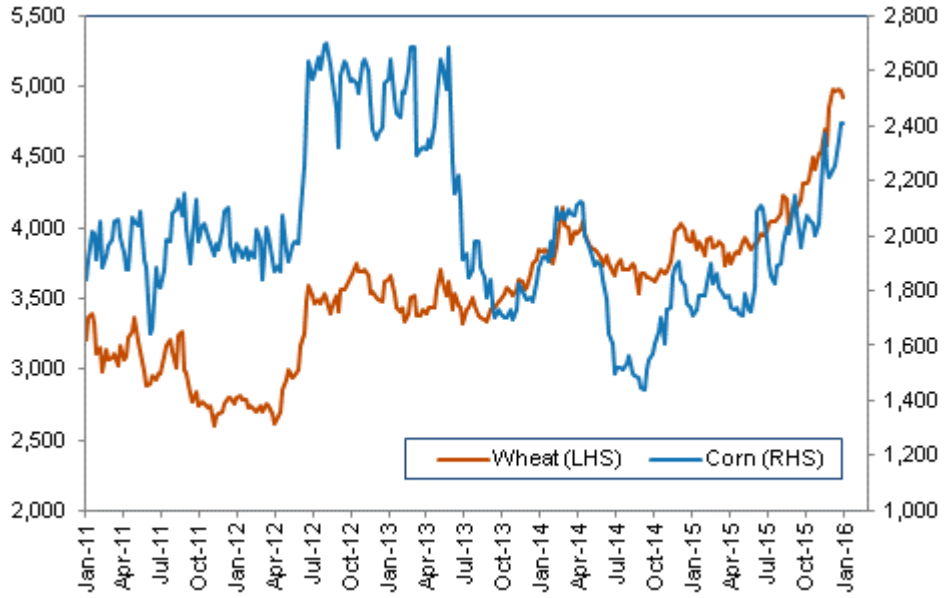
Three major components would need to materialise in order for agricultural machinery sales to pick up across most of Africa in the short term. These are: **high farm incomes** resulting mainly from high commodity prices; **positive financial conditions** such as low interest rates and improving access to credit;

and **a favourable exchange rate**, as African nations rely overwhelmingly on imports of agricultural equipment. On the basis of these three criteria, we see **particularly weak agricultural equipment sales in Africa over the coming quarters** as all three factors will remain absent in 2016. In South Africa, tractor sales will be particularly bleak in 2016 as the rand will remain weak, while farmers' revenue will be affected by the drought recorded in the country this season. Tractor sales already fell by more than 12% over 2015 while combine sales fell by almost 37%, a trend we do not expect to reverse in 2016.

We highlight a regional disparity between North Africa and SSA regarding the outlook for grains prices in 2016. North African countries will see subdued grains prices due to ample stocks from a good 2015/16 harvest (*see 'Inflation Picking Up From H216', January 25*) while SSA countries are facing sharp increases in food prices due to exceptionally dry weather across 2015 impacting yields (*see 'Consecutive Droughts To Threaten Food Security', November 19 2015*). Although higher prices should benefit SSA farmers, the smaller crop has been unable to meet domestic needs, meaning farmers are hit twice by the poor harvest as they lack both food supply and revenue. Moreover, African farmers are largely dependent on subsidies and government policy for income stability, making any increases contingent on improved public finances and well-targeted implementation.

## SSA Machinery Sales Will Not Benefit From Higher Grains Prices

**South Africa - Front-Month SAFEX Corn (ZAR/100 tonnes) & Wheat (ZAR/50 tonnes)**

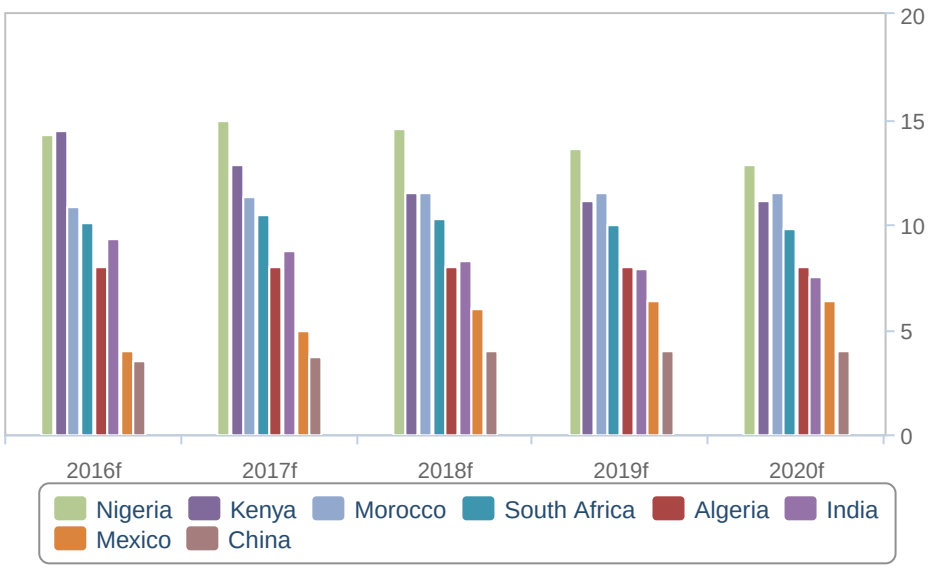



*Source: Bloomberg, BMI*

Financial conditions across many African countries will not significantly improve over the coming months, which will limit loan growth. Indeed, the FAO has stated that 'lack of finance is the overwhelming reason why farmers cannot purchase machinery'. Our Country Risk team sees lending rates across most African nations remaining high, having barely changed over the last five years. High interest rates will continue to combine with generally poor credit conditions to limit equipment purchases.

## Higher Rates In Africa

**Select Countries - Average Lending Rate By Year (%)**

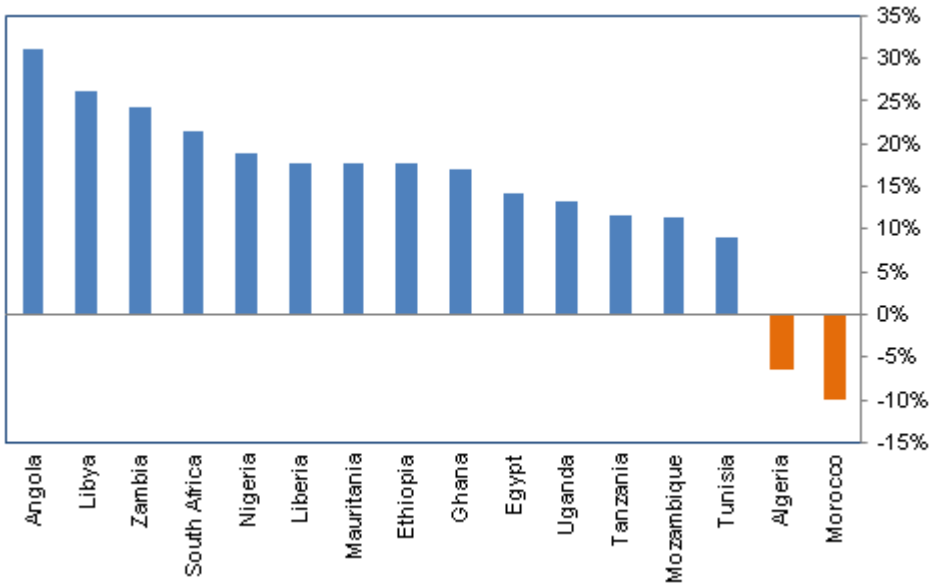



*f = BMI forecast. Source: National Sources, BMI*

Over the next five years, we believe South Africa and North African countries will remain the key markets for agricultural machinery companies in Africa. This is because we forecast these regions, already the continent's largest producers, to see the strongest growth in corn and wheat production respectively between 2015/16 and 2019/20. Moreover, our Country Risk team forecasts the currencies of Algeria and Morocco to appreciate against USD between 2016 and 2020, which will help to sustain machinery imports. Indeed, **Mahindra & Mahindra** indicated as part of their 2015 results that Algeria remains the biggest market for their tractor segment in Africa.

## Machinery Sales In Algeria & Morocco To Benefit From Stronger Currencies

**Select Countries - Cumulative Forecast Exchange Rate Depreciation Against USD, 2016-2020**



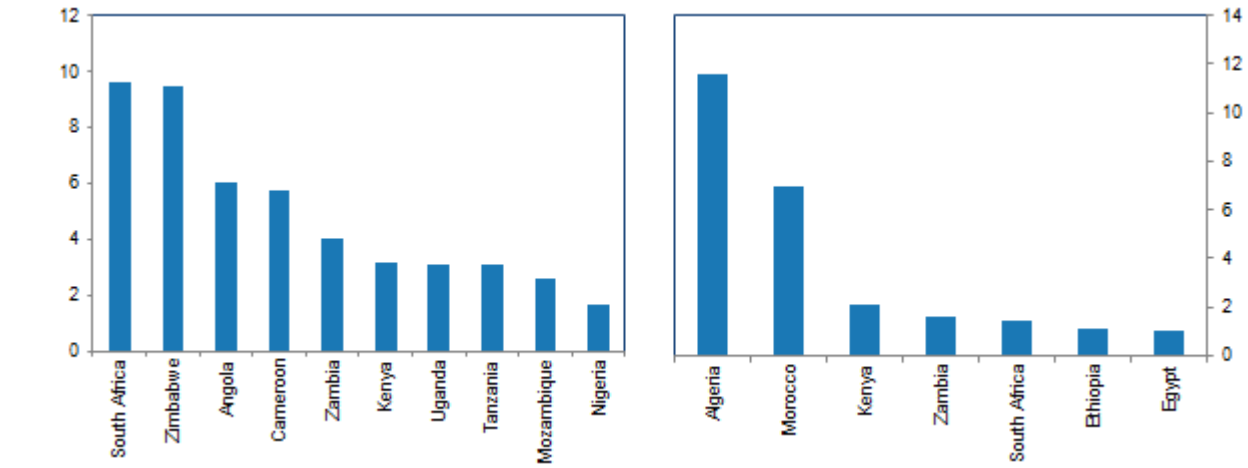

*Source: BMI*

### Machinery Companies To Retain Existing Market Shares

The competitive landscape of the African agricultural machinery market will remain stable over the next five years due to the lasting structural impediments we outlined previously (*see above*). Indian tractor companies such as Mahindra & Mahindra and **Sonalika** will continue to see strong growth in Africa as their products are better-suited to the continent's current agricultural industry. This is because Indian companies mainly produce lighter tractors in line with Africa's small-scale farming and local farmers' limited budgets. On the other hand, contractors hired by farmers to perform tasks such as land preparation or transportation constitute an important market for the bigger tractors sold by Western firms such as **Deere & Co**, **CNH Industrial** and **AGCO**. In contrast with their strategy of providing innovative equipment and pursuing precision agriculture technology to achieve growth in their mature markets (*see 'Global Company Strategy - Deere & Company', January 11*), the Western companies sell less sophisticated tractors manufactured in Brazil to their African consumers. This enables them to reduce costs and compete in a market where frugal innovation remains the prevailing factor to achieve growth.

## South & North African Countries To Remain Centres Of Growth

**Select Countries - BMI Corn (LHC) & Wheat (RHC) Production Growth Forecasts, 2016-2019 (average % chg y-o-y)**




*Note: The strong growth in South Africa and Zimbabwe is partly due to base effects as the 2016/17 crop recovers from a severe drought-induced decline in 2015/16. Source: USDA, FAPRI, BMI*

### Obstacles To Long-Term Growth

In order to increase profitability in African agriculture, we believe that partnerships with food companies, the development of co-operatives and greater access to credit are three of the primary goals that need to be achieved. Similarly, there will need to be investment into sectors strongly linked to agricultural equipment if the sector is to thrive in the coming years. The development of infrastructure, such as roads, ports, power and finance, will be necessary for sustained growth in the agricultural equipment sector. However, our Country Risk team sees limited upside for infrastructure projects in SSA in the coming months as both public and private investment slow (*see 'SSA Infrastructure RRI: Capital Constraints Binding', October 7 2015*).

A number of African governments and multinational agricultural machinery companies have tried to improve mechanisation rates through significant investment of capital in recent years. However, we believe these efforts will ultimately have limited success until inherent institutional problems are improved and other input usage develops.

**Table: Farm Size By Region (2012)**

| | Mean Size (ha) | % <2 ha |
|---|---|---|
| Central America | 11 | 63 |
| East Asia | 1 | 79 |
| Europe | 32 | 30 |
| South America | 112 | 36 |
| South Asia | 1 | 78 |
| South-East Asia | 2 | 57 |
| Sub-Saharan Africa | 2 | 69 |
| United States | 178 | 4 |
| West Asia & North Africa | 5 | 65 |

*Source: World Bank, Oxfam*

One major restriction on machinery sales growth in Africa is average farm size. According to FAO estimates, 80% of all farms in Africa had an area of less than two hectares in 2012. Though emerging Asian farms are generally as small as their Sub-Saharan African counterparts, the use of biotechnology, resulting in larger crops and increasing farm profitability, has provided the impetus for increased mechanisation in Asia. However, we view a similar trend as unlikely to occur in Africa given the limited outlook for genetically modified crop adoption over the coming years (*see 'Africa GM Outlook', December 30 2015*).

# Africa GM Outlook

***BMI View:*** *GM crop adoption will be limited in Africa over the coming years due to inherent institutional and structural problems and a lack of policy cohesion. We see growth being driven by the greater adoption of GM cotton varieties over the next few years, as opposed to grains for human consumption. Moreover, we expect South Africa to remain the leading country in Africa for GM use and development, although other countries are showing signs of liberalising their regulations.*

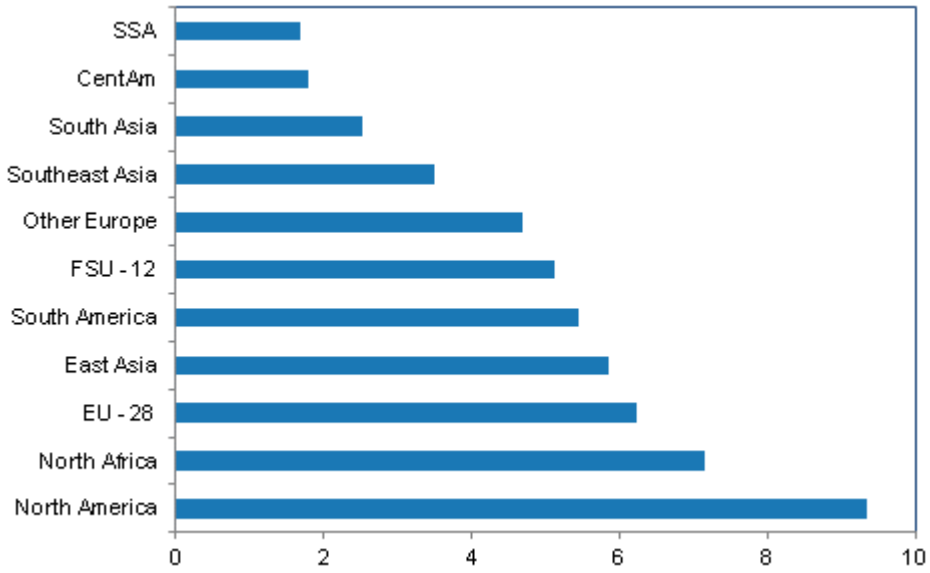
**Consistently Poor Yields**

African countries have experienced serious food shortages in the past two decades and have historically faced domestic production deficits about every three years. The continent's agricultural yields are very low by global standards, and crops are very dependent on weather patterns, with heavy rains often leading to disease outbreaks.

In the 1990s, South Africa was the first country in Africa to commercialise biotech cotton, maize and soybean, and the country was followed by Burkina Faso (cotton), Sudan (cotton) and Egypt (corn and cotton). South Africa is by some distance the largest user of genetically modified (GM) crops in Africa and the ninth largest producer of GM crops in the world. The country had a biotech crop production area of 2.9mn hectares (ha) in 2014.

## SSA At The Bottom

**Select Regions - 2015/16 Corn Yield (tonnes/ha)**



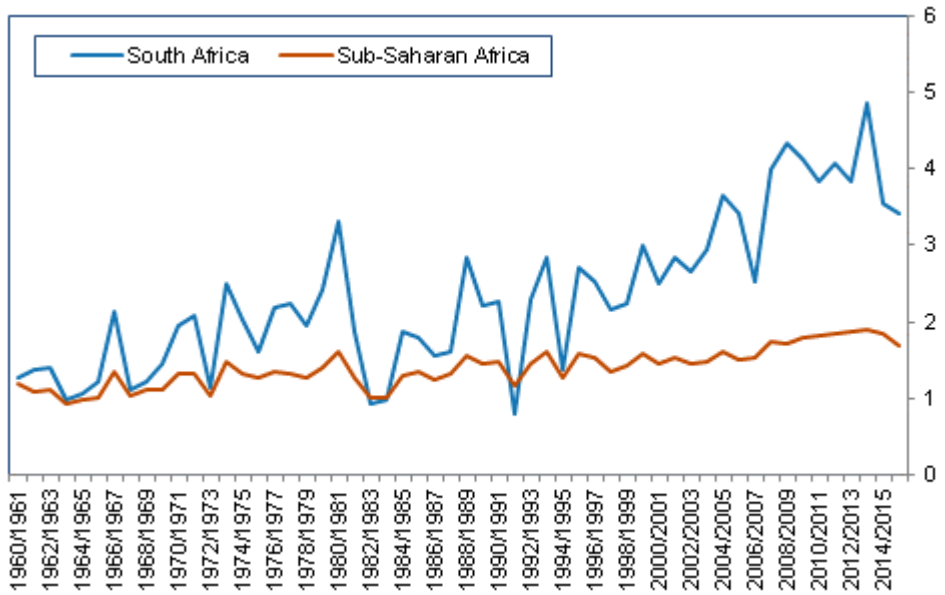

*Note: 'SSA' refers to Sub-Saharan Africa, 'CentAm' refers to Central America, 'FSU-12' refers to Former Soviet Union - 12.*
*Source: USDA*

### South Africa's GM Success To Last

After its early adoption of GM crops, South Africa has seen substantial growth in yields for corn and soybean. Since the 1990s, the country has been able to grow its corn production to supply growing feed and food needs, as well as being Sub-Saharan Africa (SSA)'s main corn exporter, despite steadily decreasing acreage. In 2014, GM seeds represented 87% of corn plantings, 90% for soybean and 100% for cotton. However, there is still ample room for growth, as evidenced by a 37% y-o-y increase in the share of soybean in total GM plantings in 2014. In the coming years, we expect South Africa to continue leading the continent's GM crop usage. This will be possible due to the country's well-functioning and integrated biosafety regulations, from the seed application process to consumer protection.

**GM-Driven Outperformance**

**Select Regions - Corn Yields (tonne/ha)**

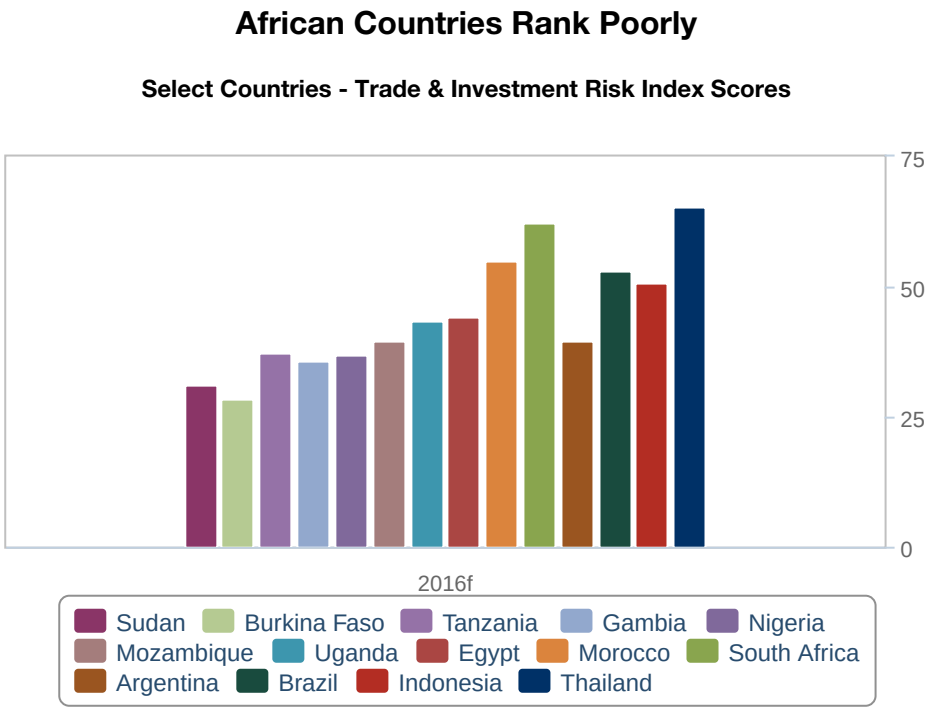



*Source: USDA, BMI*

**Inherent Institutional Problems**

GM use across other parts of Africa will remain weak over the coming years **owing to inherent problems across the African farming system**. Farmers in the continent have difficulty building savings or acquiring credit for expensive inputs, such as GM seeds and machinery. Profitability in the sector remains weak, as poor yields and inefficient or non-existent storage systems mean that a large portion of farming on the continent is for subsistence. Indeed, 80% of farmers in SSA are smallholders, with many living from one harvest to the next. Ultimately, African farming will have to move away from subsistence agriculture and become more profitable in order to support a thriving GM sector.

We believe that **partnerships with food companies**, **the development of cooperatives** and **greater access to credit** are three of the most important strategies in order to achieve greater profitability in the sector (*see 'Africa GM Outlook', 28 May 2015 for further discussion*).




*f = BMI forecast. Source: BMI*

**Limited Policy Cohesion**

Another major barrier to GM seed growth in the continent is the lack of common agreement between African nations. According to the New Economic Partnership for Africa's Development (NEPAD), one of the major reasons for the lack of wide-scale GM adoption is the absence of functional regulatory systems, both domestically and across the continent. Although only three countries (South Africa, Burkina Faso and Sudan) currently plant GM crops commercially, a growing number of countries are conducting field trials (*see below*). On the other hand, little cohesion exists in policy decisions. According to the NEPAD African Biosafety Network of Expertise, only 23 African countries have some form of biosafety regulation as of 2016. Indeed, Uganda is conducting field trials without biosafety laws, while Nigeria had previously done so before passing a biosafety law in 2015, highlighting the disjointed nature of GM use in Africa.

One of the greatest points of contention over GM use in Africa is over the control of first-generation seeds. First-generation seeds are patented by seed companies and are only allowed to be used for one season before farmers have to purchase new seeds for the next year. Using seeds derived from the resulting crops

for the next season is therefore illegal. According to the US Department of Agriculture, 80% of African farmers currently reuse seeds from the previous crop. Patent rights will prove to be a major obstacle to GM companies in Africa as a result of smallholdings.

## Disparate GMO Status In Africa

**Africa - GMO Status By Country**


*Note: countries labelled as 'Biosafety Laws' are not doing any field trials. Apart from Uganda, all countries labelled as 'Field Trials' have biosafety laws in place. Finally, all countries labelled as 'Commercial GMO' have biosafety laws in place. Source: African Biosafety Network of Expertise (ABNE), BMI*

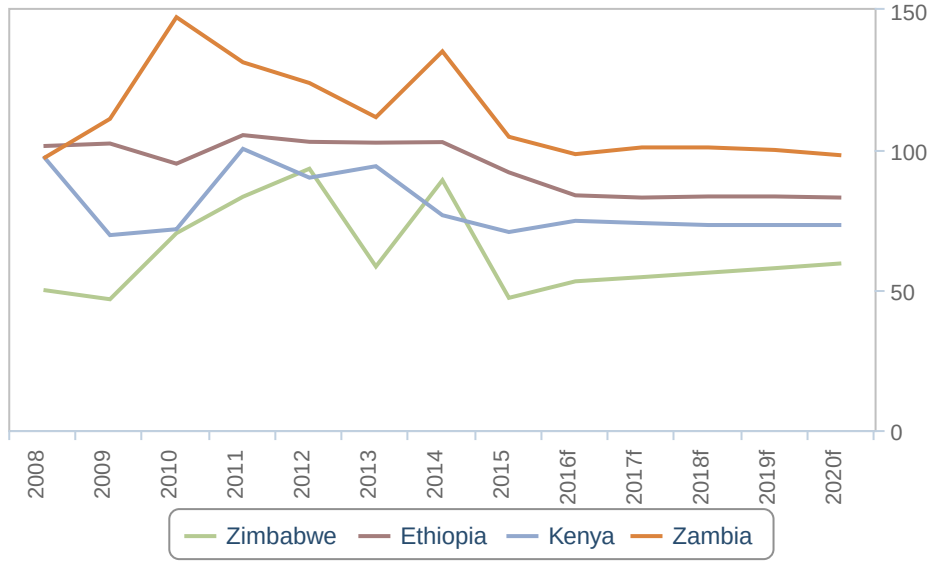
**Adapting GM Technology To Africa Will Support Uptake**

We believe there is great potential for GM uptake by African farmers if the technology adapts to their needs and budgets. Developments over the last five years in GM varieties for crops such as sorghum and cassava, which are African favourites, will help to promote the technology on the continent. Nevertheless, the greatest successes will be achieved through close cooperation with local stakeholders such as African scientists and famers collaborating on improving local strains to adapt to changing conditions.

The continent's traditional strict opposition to GM technology appears to be easing as a growing number of countries are conducting field trials or improving their regulatory frameworks on GM crops. Notably, Kenya's decision in Q116 to allow GM corn trials could inspire less advanced countries in SSA to follow the same path. Moreover, the extensive drought that hit the Southern part of SSA over 2015 and continues to weigh on the region's food security has the potential to accelerate a change in mindset. Indeed, countries such as Zimbabwe, which enforce bans on GM imports, could be forced to authorise imports of GM food over 2016 as an extraordinary measure to alleviate food security threats.

**2016 Food Security Threats To Help GM Acceptance**

**Select Countries - Corn Self-Sufficiency (%)**




*f = BMI forecast. Source: USDA, BMI*

**Cotton To Remain The Leading GM Crop**

Even with the promising increase in grains yields from the WEMA programme, we believe that the greatest growth from seeds firms in Africa over the next few years will come from cotton crops. Many of the nations that are conducting GM field trials (such as Nigeria and Uganda) are major cotton producers relative to the size of their agricultural industries.

Burkina Faso, the leading GM crop user in francophone West Africa, is currently planting only one GM crop: Monsanto's Bt cotton. Farmers have raised concerns over the poor fibre length of the crop, leading them to decrease plantings of Bt cotton in 2015/16. However, we believe this issue is unlikely to hinder the progress of GM cotton in the region as evidenced by the rapid growth in Bt cotton plantings in countries such as Sudan over the last five years.

In May 2015, Ethiopia relaxed its strict policy on genetically modified organisms, and will look to use GM seeds commercially in the coming years. Ethiopia is a major producer of cotton in Africa and the Ethiopian textile and apparel industry is considered a key sector for the country's economic development. However, the industry's growth is outpacing domestic cotton production, making it dependent on imports and impeding its development, which will support the use of GM seeds. In contrast, wide opposition towards human consumption of GM crops will ensure that policy bottlenecks remain over the coming years, which underpins our view for GM cotton to outperform other crops.

## Africa Fertiliser Outlook

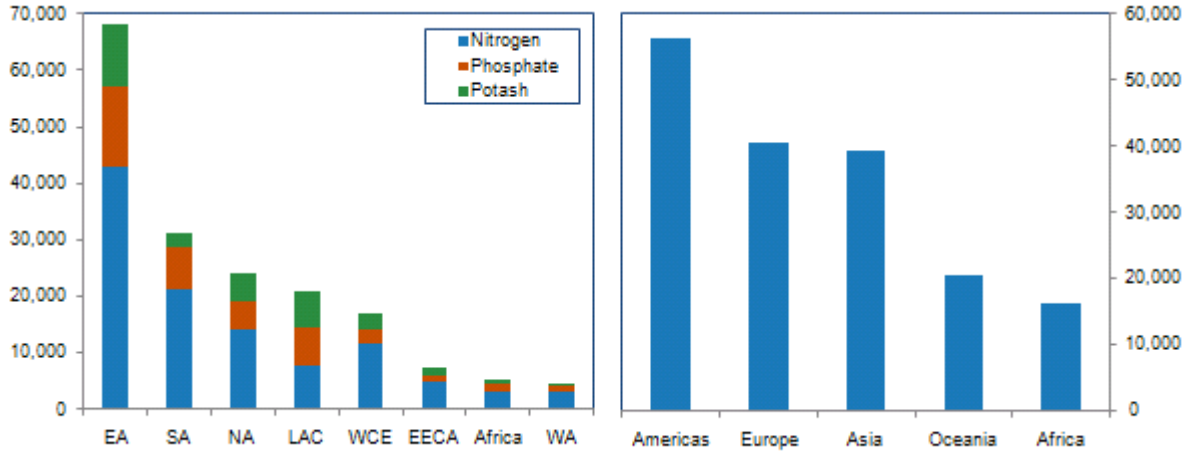
***BMI View:*** *African fertiliser consumption will remain subdued in the coming years due to low farm incomes and high import costs. Moreover, poor transport infrastructure and storage facilities will mean fertiliser costs will remain elevated. The continent has better opportunities on the production side, particularly phosphate fertilisers in Morocco.*

Africa is a minor player in the global fertiliser market, accounting for just 2.8% of world consumption in 2013, according to the International Fertilizer Industry Association (IFA). This is particularly true in Sub-Saharan Africa (SSA), where average annual fertiliser use amounts to 8kg per hectare (ha), compared with a global average of 107kg/ha. In SSA, six countries (Nigeria, Tanzania, Ethiopia, Zimbabwe, Sudan and Kenya) account for two-thirds of consumption. There is, therefore, a negligible amount of fertiliser used in other SSA countries. Although consumption has risen markedly since 2003 owing to greater government support schemes, we expect further growth to be limited in light of lower subsidies (*see below*).

On the production side, Africa has substantial resources for fertiliser production, most notably nitrogen and phosphate. Africa is a net fertiliser exporter, with Egypt, Morocco and Tunisia accounting for 86% of African fertiliser production. Most of this production is exported owing to a lack of demand from SSA countries.

## Poor Fertiliser Use Anchors African Yields

**Select Regions - 2013 Fertiliser Consumption ('000 tonnes nutrients, LHC) & Cereals Yield (hg/ha, RHC)**

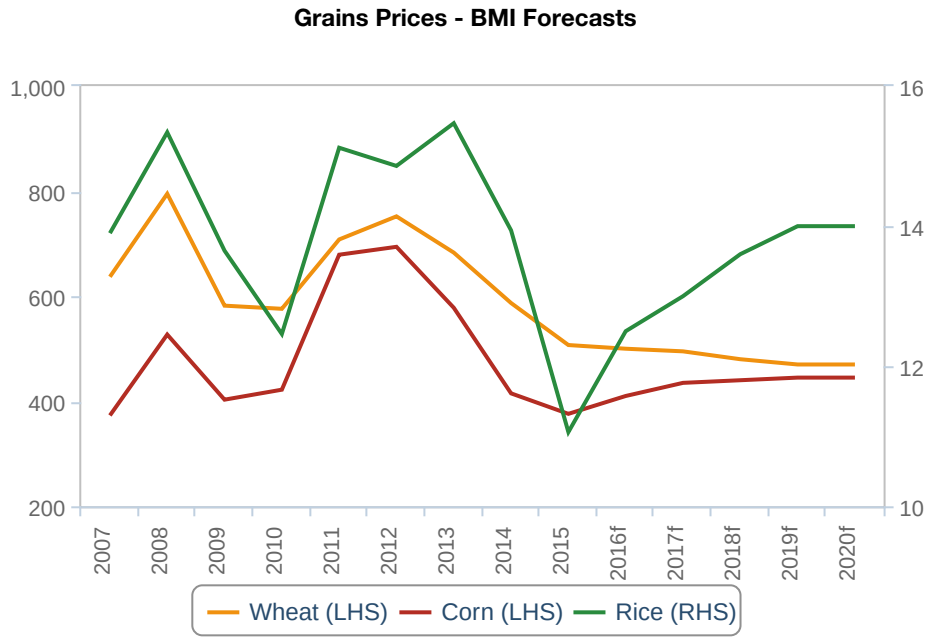



*Note: 'EA'= East Asia; 'SA'=South Asia; 'NA'=North America; 'LAC'=Latin America and the Caribbean; 'WCE'=Western and Central Europe; 'EECA'=Eastern Europe and Central Asia; 'WA'=West Asia. Source: IFA, FAO, BMI*

### Significant Consumption Headwinds

Fertiliser use in Africa will experience slow growth over the next few years for several reasons. **First**, we expect farmer incomes to remain low despite our forecasts for grains prices to head higher in 2016 (*see 'Corn: Prices To Average Above Spot Levels In 2016', January 28*). This is because African farmers are largely dependent on subsidies and government policy for income stability, making any increases contingent on improved public finances and well-targeted implementation. However, government subsidies to farmers will be lower over the coming years owing to a decline in fiscal receipts, which will reduce support networks for grains farmers in many African nations (*see 'African Agriculture: Lower Growth Over Coming Years', April 29 2015*).

**Limited Upside For Grains Prices To 2020**

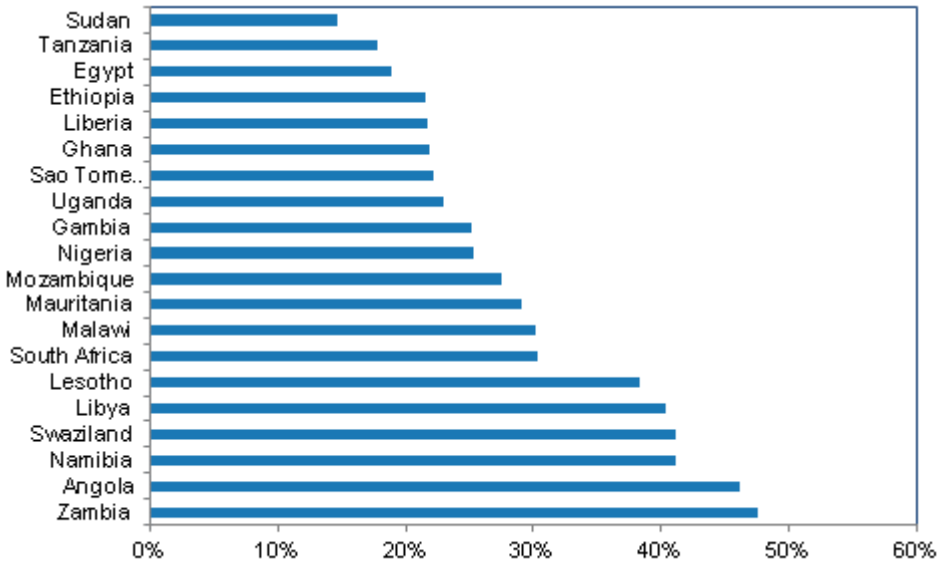



*f = BMI forecast. Note: Corn and wheat prices are quoted in USc/bushel, while the price of rice is quoted in USD/cwt. Source: Bloomberg, BMI*

**Second**, African currencies have largely depreciated relative to the US dollar over the past year, which has made imports of fertiliser - particularly nitrogen and potash, where large-scale operations in the continent do not exist - more expensive. SSA imports 90% of its fertiliser needs, which makes the region reliant on foreign exchange for its fertiliser consumption. Our Country Risk team forecasts further currency depreciation for many SSA countries in the coming years, which will mean downside pressure on fertiliser imports, though it is good news for exporters in northern Africa.

## Weakening Currencies To Limit Fertiliser Imports

**Select African Countries' Exchange Rate - Cumulative Forecast Depreciation Against USD, 2015-2020**




*Source: BMI, Bloomberg*

### Structural Factors To Constrain Consumption Growth

Despite fertiliser consumption coming from a very low base across much of Africa, we believe that the continent will not enjoy significant growth until inherent institutional problems are addressed. Many of these are similar to those we have highlighted in previous analysis (*see 'Africa GM Outlook', September 22 2015*), namely poor profitability in the sector and the dominance of small-scale, subsistence agriculture. However, we highlight logistics, storage availability and costs as key impediments to the development of the African fertiliser industry.

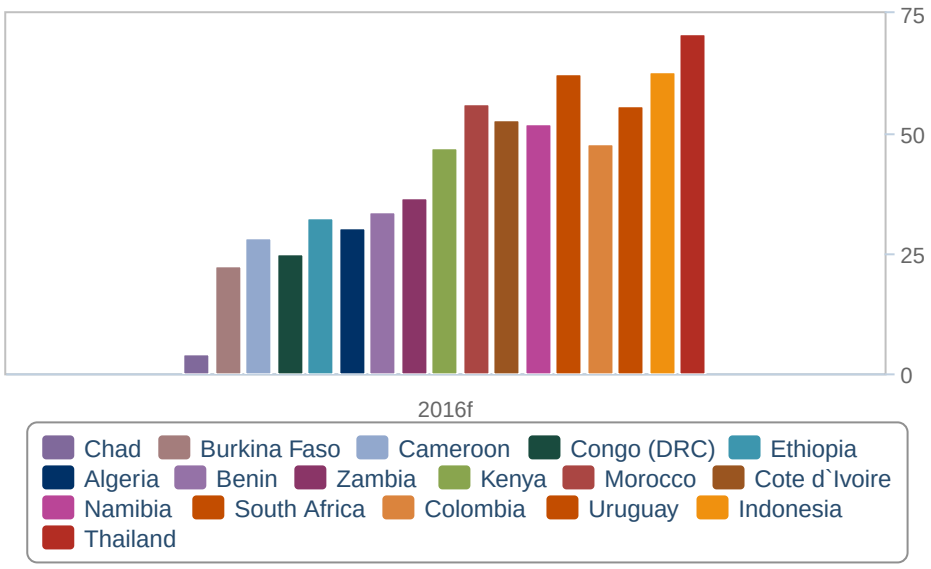
While the cost of fertiliser itself is similar for African and non-African countries, high transport costs and taxes result in inflated prices in Africa. Infrastructure across most of the continent is notoriously poor; it is no surprise that four out of the six largest fertiliser-using countries in SSA are coastal. Roads and ports in many regions are poor, often congested and costly to use due to frequent checkpoints. Furthermore, the distribution process passes through a number of middlemen, resulting in costlier fertiliser. Our Infrastructure team highlights the strong growth of investment in transport infrastructure among SSA

countries (*see 'Transport Investment Indicates Logistics Potential', January 27 2015*), but this is unlikely to improve fertiliser trade in the coming years.

At the end of the supply chain, inadequate storage facilities mean that a cost-effective amount of fertiliser cannot often be purchased and a great deal is lost to wastage. We believe that significant improvements in the physical and financial infrastructure in many African countries will need to be made before fertiliser consumption markedly improves. However, our Country Risk team sees limited upside for infrastructure projects in SSA in the coming months as both public and private investment slow down (*see 'SSA Infrastructure RRI: Capital Constraints Binding', October 7 2015*).

**Poor Transport Network Increases Cost Of Imported Fertilisers In Africa**

**Select Countries - Transport Network Index**




*f = BMI forecast. Source: BMI*

**Production Opportunities Exist**

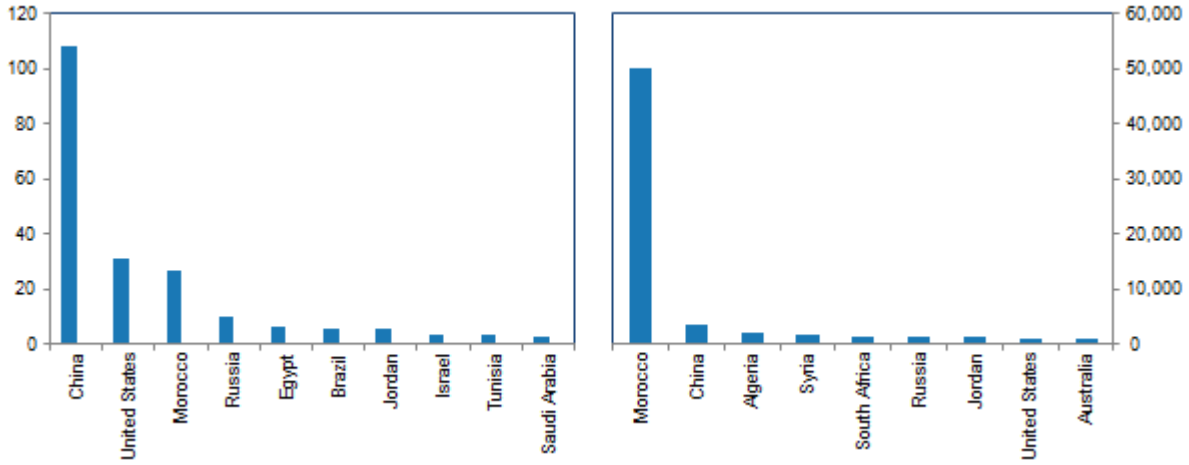
We believe Morocco will strengthen its position as a leading producer of phosphate fertilisers over the coming years, as the country will account for a major share of the growth in phosphate rock and phosphoric acid capacity and processing (*see 'Phosphate Fertilisers: A Primer', January 26*). More specifically, **OCP**

**Group**, a state-run Moroccan enterprise with exclusive access to the country's reserves, aims to more than double its production capacity of phosphate fertilisers between 2013 and 2025. Additionally, we highlight the growing importance of African countries among destinations of OCP Group's fertiliser, as Africa accounted for 25.5% of OCP Group's exports in H115, up from 12.6% in H114. This indicates that Morocco is well positioned to supply potential fertiliser demand from SSA countries (*see 'Phosphate Investments To Boost Exports, Rapprochement With Africa', February 9*).

On the other hand, we hold a less positive view on the recent prospects for fertiliser production in SSA. Companies from Israel, China, Canada, Morocco and Indonesia have recently announced plans to exploit resources in countries such as Togo, Guinea-Bissau, Gabon and Senegal. Although local fertiliser production might be a way to bypass elevated transportation costs and supply local demand, the projects are unlikely to be profitable. This is because the volumes produced at such an early stage will be too low to benefit from economies of scale and reduce costs, which will make such products uncompetitive in comparison to those offered by overseas industry leaders.

## Morocco To Remain Leading African Fertiliser Producer

**Phosphate Rock - 2013 Mine Production (LHC) & Reserves (RHC), mn Tonnes**




*Note: Data for Morocco includes Western Sahara. Source: USGS, BMI*

**Risks To Outlook**

The main risk to our outlook is to the upside. The upcoming depreciation in SSA currencies could provide impetus for large-scale fertiliser production in the region, as the cost of imported fertilisers becomes prohibitive. However, above-expectations production would not translate immediately into greater consumption, for which we maintain our subdued outlook.

# Downstream Analysis

## Food

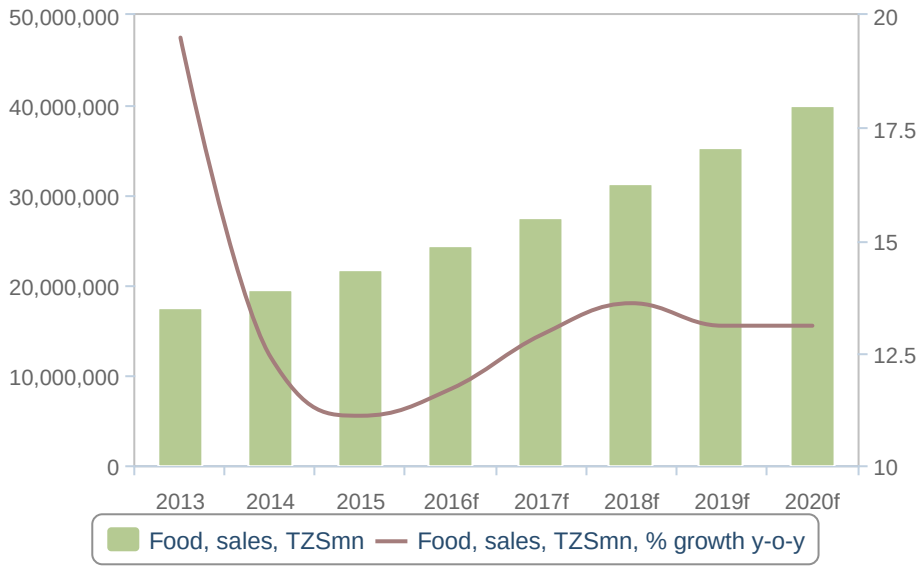
***BMI View:*** *Tanzania's food sector will be one of the most resilient markets over our forecast period to 2020 as a result of growing disposable incomes and sustainable household spending. The industry will attract substantial foreign investment due to robust growth opportunities as the country still offers large room for development.*

### Latest Updates

- Food sales (local currency) growth in 2016: 11.7%, compound annual growth rate (CAGR), 2015 to 2020: 12.9%.
- The country's growing consumer confidence, due to rising disposable incomes, will boost sales growth in non-essential products.
- Stable food sales will remain resilient, led by rice sales, owing to the country's rising investment in agricultural production.

**Food Sales**

**(2013-2020)**




*f = BMI forecast. Source: BMI, national statistics*

## Structural Trends

We hold a positive outlook for Tanzania's food industry, on the back of a strong economy surviving 2015 headwinds. We expect strong economic growth over our five-year forecast period to 2020, as the country sees positive recovery in 2016 from a weak currency (about 25% depreciation over 2015). We forecast real GDP growth will rise by 6.1% in 2016 as the currency gains greater stability, owing to a softer dollar, which will help ease inflationary pressures. Moreover, we forecast consumer confidence will rise as GDP per capita increases from USD700 in 2015 to USD1,018 to 2020.

As a result, Tanzania's food industry will experience strong growth with food sales reaching a 12.9% CAGR over our forecast period to 2020. The country remains fairly self-sufficient in food production, and does not rely heavily on food imports. The Tanzanian food market will benefit from the country's growing investment in infrastructure as funds towards road development increase, therefore, improving the ease of doing business.

We forecast staple foods to experience the highest growth sales, bread, rice and cereal sales will grow by 18.7% to 2020. Tanzania is one of the East Africa regions leading rice producer, with aims to further improve the industry; Tanzanian farmers are encouraged to increase their processed rice production. We expect rice consumption will rise over our forecast period as investment in the industry increases. The country has been exposed to high food inflation due to a weakening currency, though there has been significant relief in food prices from January 2016 with food inflation down to 7.1% in April from 10.7%. However, in February 2016, more than 10 Iranian companies announced their plan to invest in rice, corn and wheat farms. Based on the increasing investment in the industry for local production, we believe this will ease on food prices as the country also benefits from increased export levels.

We believe high levels of private consumption will drive industry growth of non-essential foods, such as the confectionery segment. Our forecast for sugar and sugar products sales will grow by 10.6% over to 2020, owing to rising purchasing power in Tanzania. The country's growing economy and business friendly environment will encourage investment from international players, together with growing consumer demand for luxury products.  In January 2014, Turkish food company **Yildiz Holding's**, announced its plans to expand its snacks and biscuits segment in Tanzania, Kenya and Uganda.

Tanzania's meat industry will remain resilient as consumption in the country is fairly high. We forecast a 10.9% growth rate over 2016 for meat and poultry sales, stemming from high per capita consumption. In December 2015, the Organisation for Economic Cooperation and Development (OECD) reported Tanzania as one of the world's highest per capita beef consuming country.

**Table: Food Sales (Tanzania 2013-2020)**

| | 2013 | 2014 | 2015 | 2016f | 2017f | 2018f | 2019f | 2020f |
|---|---|---|---|---|---|---|---|---|
| Food, sales, TZSmn | 17,471,259 | 19,641,830 | 21,812,347 | 24,368,241 | 27,521,900 | 31,253,932 | 35,335,356 | 39,962,451 |
| Food, sales, TZSmn, % growth y-o-y | 19.5 | 12.4 | 11.1 | 11.7 | 12.9 | 13.6 | 13.1 | 13.1 |
| Bread, rice and cereals, sales, TZSmn | 7,473,023 | 8,602,799 | 10,036,691 | 11,990,372 | 14,195,725 | 16,849,265 | 19,968,458 | 23,642,003 |
| Bread, rice and cereals, sales, TZSmn, % growth y-o-y | 31.8 | 15.1 | 16.7 | 19.5 | 18.4 | 18.7 | 18.5 | 18.4 |
| Pasta products, sales, TZSmn | 15,019.7 | 16,924.3 | 18,374.2 | 20,329.3 | 22,310.1 | 24,597.4 | 26,726.1 | 28,905.4 |
| Pasta products, sales, TZSmn, % growth y-o-y | 9.2 | 12.7 | 8.6 | 10.6 | 9.7 | 10.3 | 8.7 | 8.2 |
| Baked goods, sales, TZSmn | 556,965.9 | 616,258.6 | 657,444.3 | 296,104.6 | 317,516.4 | 341,140.6 | 360,975.5 | 379,623.3 |
| Baked goods, sales, TZSmn, % growth y-o-y | 8.5 | 10.6 | 6.7 | -55.0 | 7.2 | 7.4 | 5.8 | 5.2 |
| Meat and Poultry, sales, TZSmn | 3,402,593.5 | 3,872,064.6 | 4,215,968.6 | 4,674,333.5 | 5,134,558.4 | 5,660,516.9 | 6,160,814.7 | 6,662,492.8 |
| Meat and Poultry, sales, TZSmn, % | 12.7 | 13.8 | 8.9 | 10.9 | 9.8 | 10.2 | 8.8 | 8.1 |

| Food Sales (Tanzania 2013-2020) - Continued | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016f | 2017f | 2018f | 2019f | 2020f |
| growth y-o-y | | | | | | | | |
| Fish and fish products, sales, TZSmn | 1,212,474.6 | 1,323,247.1 | 1,392,594.2 | 1,486,857.8 | 1,563,794.6 | 1,642,584.5 | 1,696,263.9 | 1,736,077.7 |
| Fish and fish products, sales, TZSmn, % growth y-o-y | 10.4 | 9.1 | 5.2 | 6.8 | 5.2 | 5.0 | 3.3 | 2.3 |
| Dairy, sales, TZSmn | 451,500.1 | 509,247.9 | 554,483.4 | 614,869.2 | 675,545.9 | 744,948.8 | 808,849.1 | 873,382.4 |
| Dairy, sales, TZSmn, % growth y-o-y | 10.7 | 12.8 | 8.9 | 10.9 | 9.9 | 10.3 | 8.6 | 8.0 |
| Oils and Fats, sales, TZSmn | 852,063.9 | 956,425.7 | 1,034,595.3 | 1,140,071.1 | 1,245,350.1 | 1,366,064.9 | 1,476,759.0 | 1,588,785.4 |
| Oils and Fats, sales, TZSmn, % growth y-o-y | 8.6 | 12.2 | 8.2 | 10.2 | 9.2 | 9.7 | 8.1 | 7.6 |
| Fresh and preserved fruit, sales, TZSmn | 334,626.7 | 329,276.0 | 321,267.0 | 318,460.7 | 311,516.7 | 304,892.8 | 294,046.1 | 281,320.5 |
| Fresh and preserved fruit, sales, TZSmn, % growth y-o-y | 3.0 | -1.6 | -2.4 | -0.9 | -2.2 | -2.1 | -3.6 | -4.3 |
| Fresh vegetables, sales, TZSmn | 1,891,929.4 | 1,960,919.7 | 1,990,220.5 | 2,052,886.0 | 2,091,152.7 | 2,132,935.6 | 2,143,251.9 | 2,149,458.9 |
| Fresh vegetables, sales, | 10.7 | 3.6 | 1.5 | 3.1 | 1.9 | 2.0 | 0.5 | 0.3 |

| Food Sales (Tanzania 2013-2020) - Continued | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016f | 2017f | 2018f | 2019f | 2020f |
| TZSmn, % growth y-o-y | | | | | | | | |
| Sugar and sugar products, sales, TZSmn | 1,101,707.7 | 1,252,354.0 | 1,370,843.5 | 1,530,429.2 | 1,696,836.1 | 1,891,550.2 | 2,077,766.6 | 2,272,255.3 |
| Sugar and sugar products, sales, TZSmn, % growth y-o-y | 19.1 | 13.7 | 9.5 | 11.6 | 10.9 | 11.5 | 9.8 | 9.4 |
| Other food products, sales, TZSmn | 179,354.3 | 202,312.6 | 219,864.1 | 243,527.6 | 267,594.6 | 295,435.8 | 321,444.9 | 348,146.8 |
| Other food products, sales, TZSmn, % growth y-o-y | 10.7 | 12.8 | 8.7 | 10.8 | 9.9 | 10.4 | 8.8 | 8.3 |

*f = BMI forecast. Source: BMI, national statistics*

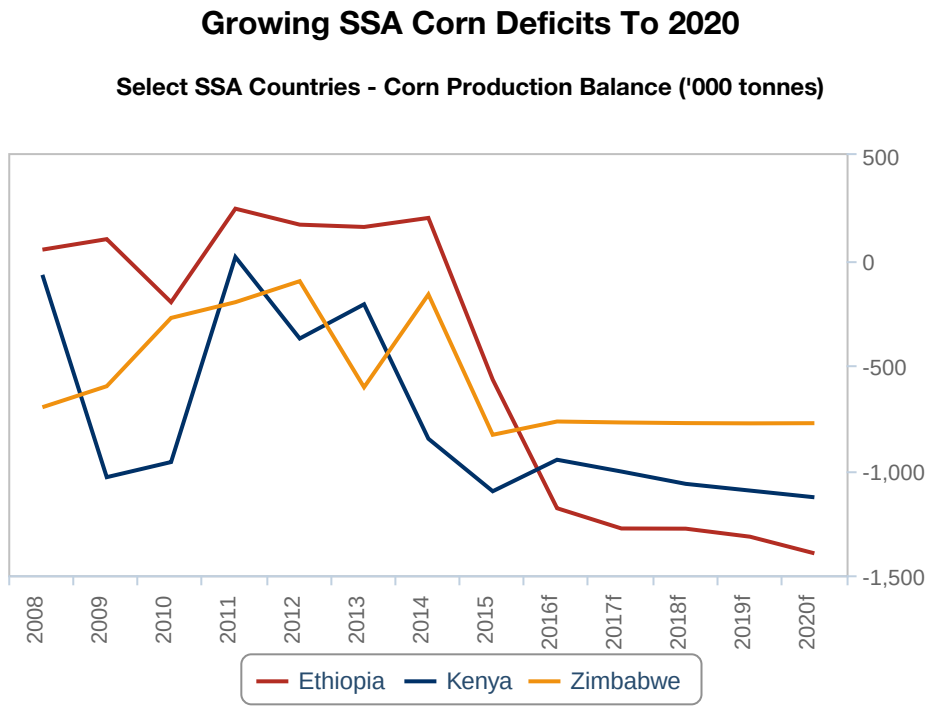
# Regional Overview

## Middle East & Africa Regional Overview

***BMI View:*** *Africa will record sustained production deficits in corn and limited growth in palm oil and other agricultural products over the coming years due to low global prices, high input costs and the poor operating environment. There will be some bright spots, as Ethiopia and Mozambique will outperform in the sugar sector. In the Middle East, the removal of almost all sanctions on Iran's economy will revive food imports to the country.*

**1. After 2015 Drought, SSA Food Security To Remain Tenuous**

Countries in south-east Sub-Saharan Africa (SSA) experienced one of the worst droughts in years in 2015, which will curb grains production and greatly increase the region's food insecurity in 2016 (*see 'Southern African Drought: Food Security And Inflation Consequences', April 14*). Our Country Risk team believes that the inflationary implications of food price rises in the Southern African region are significant, especially going into 2017, with Mozambique, Zambia and Lesotho being the most vulnerable in the region. Out to 2020, African agricultural output will grow at a slower pace than in the previous five years. This will be due to inadequate public and private investment, lower agricultural commodities prices, increasingly expensive agricultural inputs and structural problems within the region's agricultural sector. The story is similar for most countries within the continent and will result in Africa recording sustained corn production deficits over the coming years (*see 'African Agriculture: Lower Growth Over Coming Years', April 29 2015*).



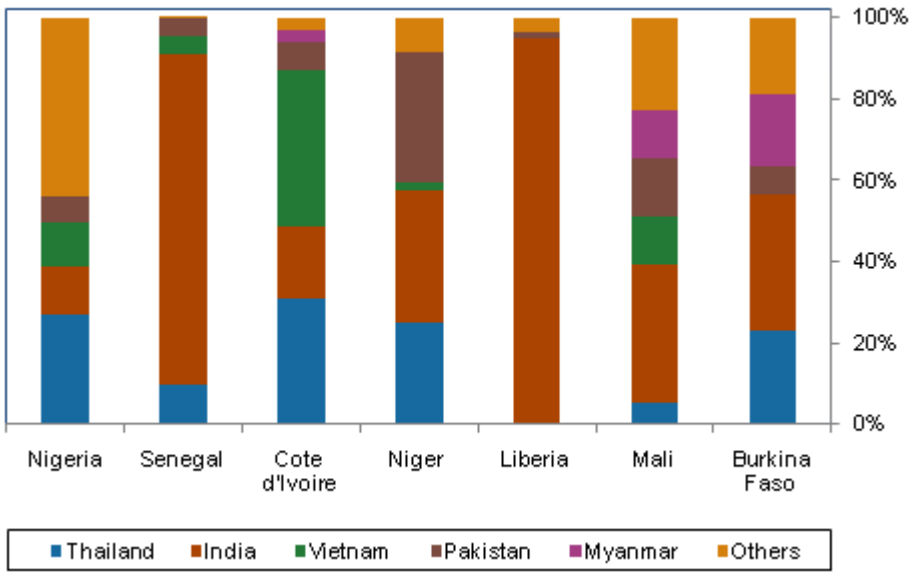

*f = BMI forecast. Source: USDA, BMI*

**2. West African Rice Imports To Suffer As El Niño Hits Asia**

Nigeria and Côte d'Ivoire will struggle to maintain their rice imports in 2016 because of lower output in Asian countries due to an El Niño-induced drought during 2015. Local prices will rise as stocks in exporting countries reach multi-year lows and the global market remains in deficit. Out to 2020, both countries will remain dependent on rice imports. However, increased public and private investments in Côte d'Ivoire will sustain solid progress towards self-sufficiency (*see 'West African 2016 Rice Imports To Suffer As El Niño Hits Asia', October 30 2015*).

**El Niño-Exposed Countries Represent Most Of Rice Origin**

**Select Countries - 2013 Import Origins (% of total)**



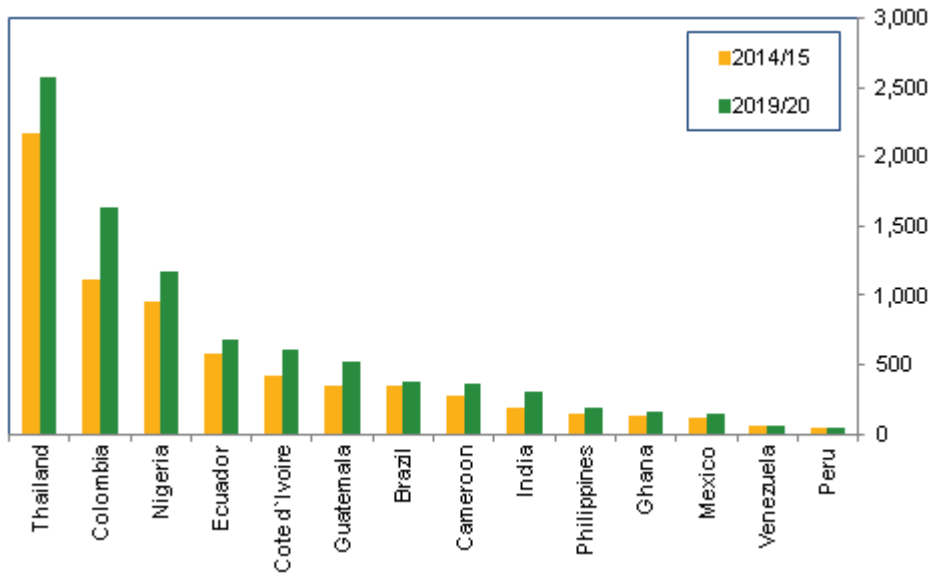

*Note: Data for Mali corresponds to 2012. Source: TradeMap, BMI.*

### 3. Africa Palm Oil: No Game Changer For Global Production

Africa's palm oil production growth will remain slow in the coming years, as structural weaknesses in the region and low international palm oil prices force foreign investors to reconsider their expansion plans in the continent. A number of factors are undermining palm oil production growth in Africa, including sub-optimal growing conditions, operating risks and hurdles, lower productivity and elevated costs of production. Consequently, although Côte d'Ivoire, Nigeria and Cameroon will record strong output growth, Africa will remain a large importer of palm oil over the coming years (*see 'Africa Palm Oil: No Game Changer For Global Production', August 4 2015*).

## African Output Growth To Have Limited Global Impact

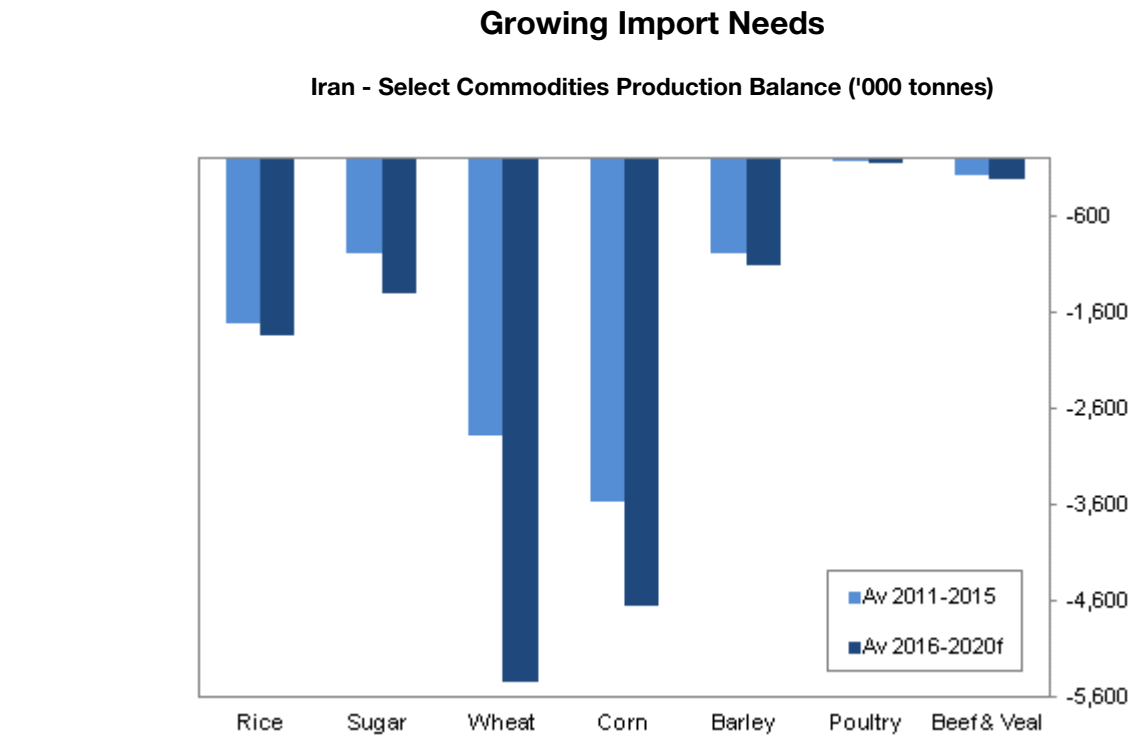
**Select Countries - Palm Oil Production ('000 tonnes)**




*Note: 2019/20 is a BMI forecast. Source: USDA, OECD, FAO, India Department of Agriculture, BMI*

### 4. Iran: Removal Of Sanctions To Revive Food Imports

The removal of almost all sanctions on Iran's economy in January 2016 will herald a new era for the country. In terms of agriculture, the return of economic growth will have the most rapid and direct impact on consumption. Production and investment in the supply chain will also benefit, but in the longer term. The lifting of sanctions will also lead to a normalisation of trade flows, which will encompass a rise in imports and the re-diversification of suppliers (*see 'Removal Of Sanctions To Revive Food Imports', February 2*).



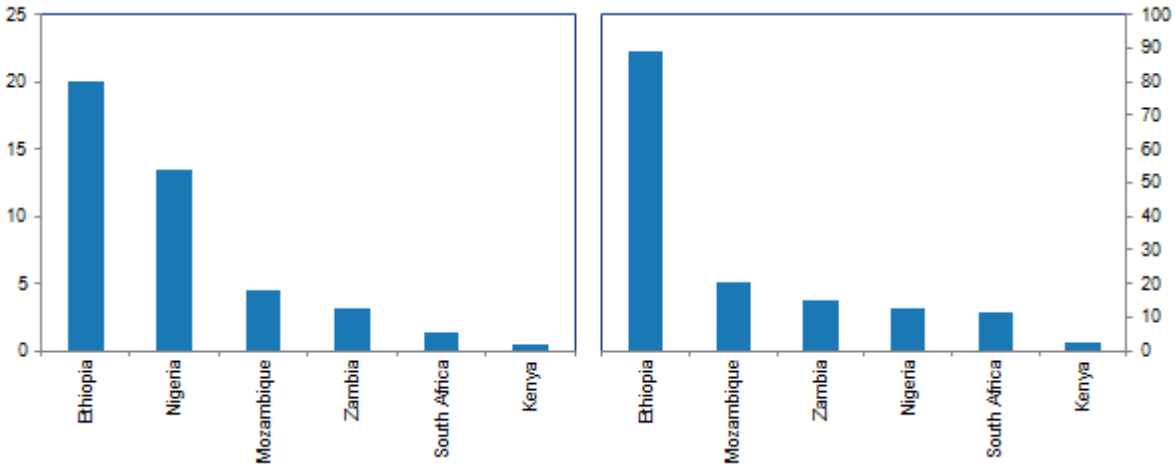

*Note: data for 2016-2020 are BMI forecasts. Source: BMI*

**5. Ethiopia & Mozambique Outperforming SSA Sugar Production**

Ethiopia and Mozambique will outperform SSA in terms of sugar production due to a combination of public and private investment, providing stable foundations for future growth. The two countries will achieve solid growth rates and substantial additional tonnage, setting them apart from other countries with subdued growth or marginal volumes (*see 'Ethiopia & Mozambique Outperforming SSA Sugar Production To 2020', February 10*).

## Ethiopia The Bright Star

**Select Countries' Sugar Production - Average Yearly Growth Rate 2016-2020 (%, LHC) & Average Yearly Additional Tonnage ('000 tonnes, RHC)**

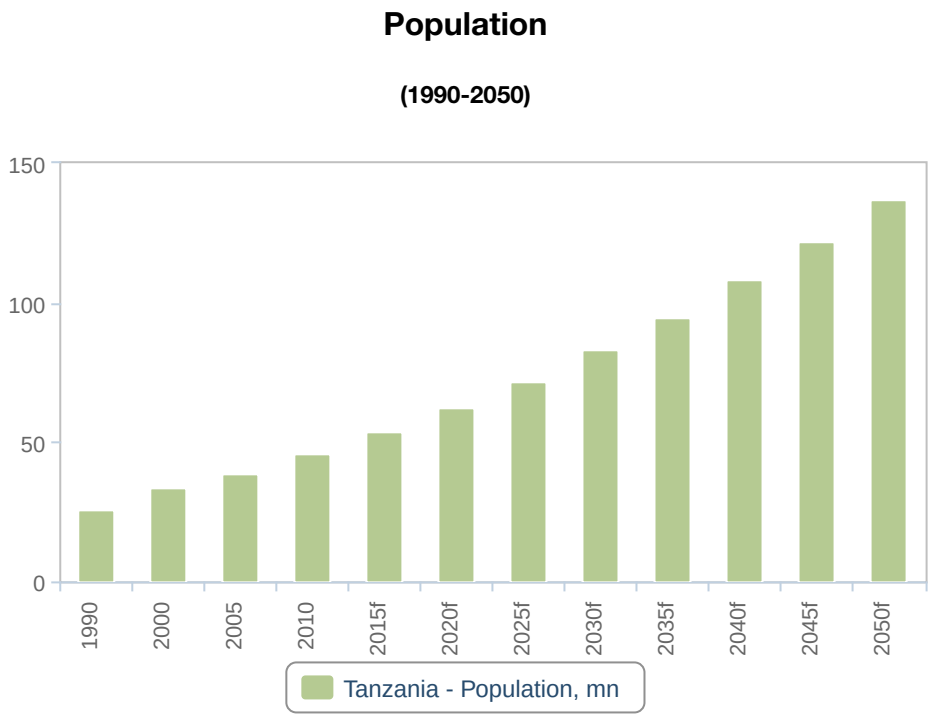



*Note: data for 2016-2020 are BMI forecasts. Source: USDA, BMI*

# Demographic Forecast

Demographic analysis is a key pillar of **BMI**'s macroeconomic and industry forecasting model. Not only is the total population of a country a key variable in consumer demand, but an understanding of the demographic profile is essential to understanding issues ranging from future population trends to productivity growth and government spending requirements.

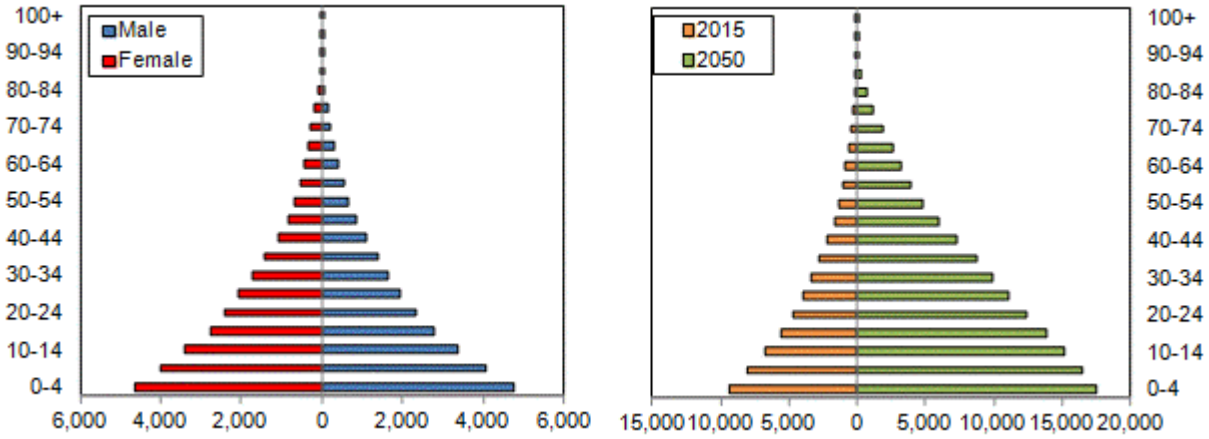
The accompanying charts detail the population pyramid for 2015, the change in the structure of the population between 2015 and 2050 and the total population between 1990 and 2050. The tables show indicators from all of these charts, in addition to key metrics such as population ratios, the urban/rural split and life expectancy.




*f = BMI forecast. Source: World Bank, UN, BMI*

## Tanzania Population Pyramid

**2015 (LHS) & 2015 Versus 2050 (RHS)**




*Source: World Bank, UN, BMI*

**Table: Population Headline Indicators (Tanzania 1990-2025)**

| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
|---|---|---|---|---|---|---|---|
| Population, total, '000 | 25,458 | 33,991 | 39,065 | 45,648 | 53,470 | 62,267 | 72,032 |
| Population, % y-o-y | na | 2.6 | 3.0 | 3.2 | 3.2 | 3.0 | 2.9 |
| Population, total, male, '000 | 12,608 | 16,910 | 19,394 | 22,665 | 26,574 | 30,992 | 35,900 |
| Population, total, female, '000 | 12,849 | 17,080 | 19,671 | 22,982 | 26,896 | 31,275 | 36,132 |
| Population ratio, male/female | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |

*na = not available; f = BMI forecast. Source: World Bank, UN, BMI*

**Table: Key Population Ratios (Tanzania 1990-2025)**

| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
|---|---|---|---|---|---|---|---|
| Active population, total, '000 | 13,054 | 17,744 | 20,295 | 23,641 | 27,590 | 32,573 | 38,575 |
| Active population, % of total population | 51.3 | 52.2 | 52.0 | 51.8 | 51.6 | 52.3 | 53.6 |
| Dependent population, total, '000 | 12,403 | 16,247 | 18,769 | 22,006 | 25,880 | 29,693 | 33,457 |
| Dependent ratio, % of total working age | 95.0 | 91.6 | 92.5 | 93.1 | 93.8 | 91.2 | 86.7 |

**Key Population Ratios (Tanzania 1990-2025) - Continued**

| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
|---|---|---|---|---|---|---|---|
| Youth population, total, '000 | 11,713 | 15,283 | 17,606 | 20,578 | 24,167 | 27,686 | 31,072 |
| Youth population, % of total working age | 89.7 | 86.1 | 86.7 | 87.0 | 87.6 | 85.0 | 80.6 |
| Pensionable population, '000 | 690 | 963 | 1,163 | 1,428 | 1,712 | 2,007 | 2,384 |
| Pensionable population, % of total working age | 5.3 | 5.4 | 5.7 | 6.0 | 6.2 | 6.2 | 6.2 |

*f = BMI forecast. Source: World Bank, UN, BMI*

**Table: Urban/Rural Population & Life Expectancy (Tanzania 1990-2025)**

| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
|---|---|---|---|---|---|---|---|
| Urban population, '000 | 4,807.5 | 7,583.2 | 9,705.8 | 12,833.6 | 16,900.9 | 21,879.5 | 27,804.7 |
| Urban population, % of total | 18.9 | 22.3 | 24.8 | 28.1 | 31.6 | 35.1 | 38.6 |
| Rural population, '000 | 20,650.7 | 26,408.4 | 29,359.8 | 32,814.9 | 36,569.5 | 40,387.8 | 44,228.2 |
| Rural population, % of total | 81.1 | 77.7 | 75.2 | 71.9 | 68.4 | 64.9 | 61.4 |
| Life expectancy at birth, male, years | 48.5 | 49.9 | 55.1 | 60.6 | 64.1 | 66.2 | 67.6 |
| Life expectancy at birth, female, years | 51.5 | 51.1 | 56.1 | 62.8 | 66.9 | 68.6 | 70.4 |
| Life expectancy at birth, average, years | 50.0 | 50.5 | 55.6 | 61.6 | 65.5 | 67.4 | 69.0 |

*f = BMI forecast. Source: World Bank, UN, BMI*

**Table: Population By Age Group (Tanzania 1990-2025)**

| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
|---|---|---|---|---|---|---|---|
| Population, 0-4 yrs, total, '000 | 4,641 | 5,907 | 7,008 | 8,135 | 9,398 | 10,427 | 11,486 |
| Population, 5-9 yrs, total, '000 | 3,822 | 5,031 | 5,695 | 6,816 | 8,019 | 9,297 | 10,337 |
| Population, 10-14 yrs, total, '000 | 3,249 | 4,344 | 4,901 | 5,625 | 6,750 | 7,961 | 9,248 |
| Population, 15-19 yrs, total, '000 | 2,722 | 3,733 | 4,191 | 4,811 | 5,540 | 6,663 | 7,880 |
| Population, 20-24 yrs, total, '000 | 2,247 | 3,166 | 3,599 | 4,107 | 4,717 | 5,441 | 6,559 |
| Population, 25-29 yrs, total, '000 | 1,844 | 2,590 | 3,031 | 3,502 | 4,005 | 4,614 | 5,333 |
| Population, 30-34 yrs, total, '000 | 1,510 | 2,066 | 2,429 | 2,917 | 3,393 | 3,900 | 4,507 |
| Population, 35-39 yrs, total, '000 | 1,222 | 1,646 | 1,897 | 2,309 | 2,797 | 3,282 | 3,792 |
| Population, 40-44 yrs, total, '000 | 1,036 | 1,322 | 1,488 | 1,786 | 2,194 | 2,687 | 3,175 |
| Population, 45-49 yrs, total, '000 | 836 | 1,062 | 1,215 | 1,404 | 1,695 | 2,101 | 2,591 |

| Population By Age Group (Tanzania 1990-2025) - Continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
| Population, 50-54 yrs, total, '000 | 676 | 891 | 976 | 1,142 | 1,329 | 1,615 | 2,014 |
| Population, 55-59 yrs, total, '000 | 539 | 709 | 821 | 903 | 1,077 | 1,259 | 1,538 |
| Population, 60-64 yrs, total, '000 | 416 | 555 | 643 | 755 | 839 | 1,006 | 1,181 |
| Population, 65-69 yrs, total, '000 | 303 | 412 | 485 | 564 | 677 | 758 | 913 |
| Population, 70-74 yrs, total, '000 | 200 | 279 | 339 | 408 | 476 | 577 | 650 |
| Population, 75-79 yrs, total, '000 | 114 | 163 | 199 | 257 | 309 | 366 | 448 |
| Population, 80-84 yrs, total, '000 | 51 | 76 | 96 | 141 | 163 | 200 | 240 |
| Population, 85-89 yrs, total, '000 | 16 | 26 | 33 | 44 | 67 | 80 | 100 |
| Population, 90-94 yrs, total, '000 | 3 | 5 | 7 | 10 | 14 | 22 | 27 |
| Population, 95-99 yrs, total, '000 | 0 | 0 | 0 | 1 | 1 | 2 | 4 |
| Population, 100+ yrs, total, '000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*f = BMI forecast. Source: World Bank, UN, BMI*

| Table: Population By Age Group % (Tanzania 1990-2025) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
| Population, 0-4 yrs, % total | 18.23 | 17.38 | 17.94 | 17.82 | 17.58 | 16.75 | 15.95 |
| Population, 5-9 yrs, % total | 15.01 | 14.80 | 14.58 | 14.93 | 15.00 | 14.93 | 14.35 |
| Population, 10-14 yrs, % total | 12.76 | 12.78 | 12.55 | 12.32 | 12.62 | 12.79 | 12.84 |
| Population, 15-19 yrs, % total | 10.70 | 10.98 | 10.73 | 10.54 | 10.36 | 10.70 | 10.94 |
| Population, 20-24 yrs, % total | 8.83 | 9.32 | 9.22 | 9.00 | 8.82 | 8.74 | 9.11 |
| Population, 25-29 yrs, % total | 7.25 | 7.62 | 7.76 | 7.67 | 7.49 | 7.41 | 7.40 |
| Population, 30-34 yrs, % total | 5.93 | 6.08 | 6.22 | 6.39 | 6.35 | 6.26 | 6.26 |
| Population, 35-39 yrs, % total | 4.80 | 4.84 | 4.86 | 5.06 | 5.23 | 5.27 | 5.26 |
| Population, 40-44 yrs, % total | 4.07 | 3.89 | 3.81 | 3.91 | 4.10 | 4.32 | 4.41 |
| Population, 45-49 yrs, % total | 3.29 | 3.12 | 3.11 | 3.08 | 3.17 | 3.37 | 3.60 |
| Population, 50-54 yrs, % total | 2.66 | 2.62 | 2.50 | 2.50 | 2.49 | 2.59 | 2.80 |
| Population, 55-59 yrs, % total | 2.12 | 2.09 | 2.10 | 1.98 | 2.01 | 2.02 | 2.14 |
| Population, 60-64 yrs, % total | 1.64 | 1.63 | 1.65 | 1.66 | 1.57 | 1.62 | 1.64 |
| Population, 65-69 yrs, % total | 1.19 | 1.21 | 1.24 | 1.24 | 1.27 | 1.22 | 1.27 |
| Population, 70-74 yrs, % total | 0.79 | 0.82 | 0.87 | 0.89 | 0.89 | 0.93 | 0.90 |
| Population, 75-79 yrs, % total | 0.45 | 0.48 | 0.51 | 0.56 | 0.58 | 0.59 | 0.62 |
| Population, 80-84 yrs, % total | 0.20 | 0.23 | 0.25 | 0.31 | 0.31 | 0.32 | 0.33 |

| Population By Age Group % (Tanzania 1990-2025) - Continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2005 | 2010 | 2015f | 2020f | 2025f |
| Population, 85-89 yrs, % total | 0.07 | 0.08 | 0.09 | 0.10 | 0.13 | 0.13 | 0.14 |
| Population, 90-94 yrs, % total | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.04 | 0.04 |
| Population, 95-99 yrs, % total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Population, 100+ yrs, % total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

*f = BMI forecast. Source: World Bank, UN, BMI*

# Methodology

## Industry Forecast Methodology

**BMI**'s industry forecasts are generated using the best-practice techniques of time-series modelling and causal/econometric modelling. The precise form of model we use varies from industry to industry, in each case being determined, as per standard practice, by the prevailing features of the industry data being examined.

Common to our analysis of every industry is the use of vector autoregressions. Vector autoregressions allow us to forecast a variable using more than the variable's own history as explanatory information. For example, when forecasting oil prices, we can include information about oil consumption, supply and capacity.

When forecasting for some of our industry sub-component variables, however, using a variable's own history is often the most desirable method of analysis. Such single-variable analysis is called univariate modelling. We use the most common and versatile form of univariate models: the autoregressive moving average model (ARMA).

In some cases, ARMA techniques are inappropriate because there is insufficient historic data or data quality is poor. In such cases, we use either traditional decomposition methods or smoothing methods as a basis for analysis and forecasting.

**BMI** mainly uses ordinary least squares estimators. In order to avoid relying on subjective views and encourage the use of objective views, we use a 'general-to-specific' method. **BMI** mainly uses a linear model, but simple non-linear models, such as the log-linear model, are used when necessary. During periods of 'industry shock', for example, if poor weather conditions impede agricultural output, dummy variables are used to determine the level of impact.

Effective forecasting depends on appropriately selected regression models. We select the best model according to various different criteria and tests, including but not exclusive to:

- $R^2$ tests explanatory power; adjusted $R^2$ takes degree of freedom into account;
- Testing the directional movement and magnitude of coefficients;
- Hypothesis testing to ensure coefficients are significant (normally t-test and/or P-value);
- All results are assessed to alleviate issues related to auto-correlation and multicollinearity;

Human intervention plays a necessary and desirable role in all or our industry forecasting. Experience, expertise and knowledge of industry data and trends ensure analysts spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not.

## Sector-Specific Methodology

Within the Agribusiness industry, issues that might result in human intervention could include but are not exclusive to:

- Technological developments that might influence future output levels (for example greater use of biotechnology);
- Dramatic changes in local production levels due to public or private sector investment;
- The regulatory environment and specific areas of legislation, such as import and export tariffs and farm subsidies;
- Changes in lifestyles and general societal trends;
- The formation of bilateral and multilateral trading agreements, and political factors.

The following two examples show the demand (consumption) and the supply (production) of rice. Note that the explanatory variables for both are quite similar, but the underlying economic theory is different.

**Example Of Rice Consumption Model**

$(\text{Rice consumption})_t = \beta_0 + \beta_1*(\text{real private consumption per capita})_t + \beta_2*(\text{inflation})_t + \beta_3*(\text{real lending rate})_t + \beta_4*(\text{population})_t + \beta_5*(\text{government expenditure})_t + \beta_6*(\text{food consumption})_{t-1} + \varepsilon_t$

Where:

- $\beta$ are parameters for this function.
- Real private consumption per capita has a positive relationship with rice consumption, if rice is a normal good in a particular country. If rice is an inferior good in a country, the relationship is negative. So the sign of $\beta_1$ is determined by a specific product within a specific country.
- When inflation is high, people with rational expectations will consume today rather than wait for tomorrow's high price to come. Higher rice demand in year t due to higher inflation in that year leads to an assumed positive sign of $\beta_2$.
- The relationship between real lending rate and rice consumption is expected to be negative. When real lending rates increase, disposable incomes, especially for those with mortgage burdens, etc, will decrease. So the sign of $\beta_3$ is expected to be negative.
- Of course, other things being equal, growth in rice consumption can also be caused by growth in population. Consequently, positive sign of $\beta_4$ is expected.

- Government expenditure typically causes total disposable incomes to rise. So the sign of $\beta_5$ is expected to be positive.
- Human behaviour has a trend: a high level of food consumption in previous years means there is very likely to be a high level of food consumption the next year. So the positive sign of $\beta_6$ is expected.
- $\varepsilon$ is the error/residual term.

**Example Of Rice Production Model**

$(\text{Rice production})_t = \beta_0 + \beta_1*(\text{real GDP per capita})_t + \beta_2*(\text{inflation})_t + \beta_3*(\text{real lending rate})_t + \beta_4*(\text{rural population})_t + \beta_5*(\text{government expenditure})_t + \beta_6*(\text{food production})_{t-1} + \varepsilon_t$

Where:

- The same as above: the relationship between real GDP per capita and rice production depends on whether rice is normal or inferior good in that country.
- If high inflation is caused by food prices increasing, farmers will be more profitable. Then they will supply more agricultural product (eg, rice) to increase their marginal (extra) profit, although this is tempered by the rising cost of other inputs in line with inflation.
- There is a global move towards corporate farming, away from small holdings, in order to achieve greater agricultural productivity. Corporate farming means more investment in the modes of production, ie, agricultural machinery. Higher real lending rates discourage investment, which in turn reduce production.
- **BMI** assumes that only the rural population has a positive effect on agricultural product supply.
- With supportive government policy, other things being equal, rice production is expected to go up. Government expenditure is likely to play some role in supporting agribusiness.
- Again, previous food production positively affects this year's prediction.

**Agribusiness Market Value**

The construction of the Agribusiness market value is done in two steps.

1. **BMI** constructs an in-house model of the agribusiness market. Where for each commodity, its forecasted production value is multiplied by its commodity price. This is repeated for each commodity in the **BMI** agribusiness universe and then aggregated to give a **BMI** agribusiness total market value. Commodity prices reflect either market prices or production prices, this depends on the commodity in question and whether sufficient data is available.
2. **BMI** uses their in-house agribusiness total market value model as a benchmark model to forecast FAO's gross production value. In addition analysts can also subjectively intervene into the model if necessary to take into account qualitative data.

To summarise the final BMI Agribusiness market value is historical data from the FAO gross production value which is then forecasted using an in-house **BMI** agribusiness market value model that is objectively and subjectively estimated.

The model itself is priced in US dollars. Conversion to local currency and euros is done directly using **BMI**'s country risk exchange rate forecasts.

**BMI** ensures that our internal model best matches the FAO gross production value definition and construction to ensure that our internal model serves as a useful benchmark.

**FAO Definition of Gross Production Value (USD)**

Value of gross production has been compiled by multiplying gross production in physical terms by output prices at farm gate. Thus, value of production measures production in monetary terms at the farm-gate level. Since intermediate uses within the agricultural sector (seed and feed) have not been subtracted from production data, this value of production aggregate refers to the notion of 'gross production'.