CHAPTER 9

A Framework for Designing a Strategic Direction for Growth and Development in Tanzania

This chapter argues that an overriding strategy is required to provide clear direction for national resource mobilisation and concentration of development efforts. In addition, it explores issues which arise in developing and implementing a direction for growth, in particular the choice of drivers of growth as well as the enabling policies and necessary resources (human and financial) to support these strategic choices.

Introduction

Broad-based and equitable growth is a central priority for the Government of Tanzania and a key outcome of the national development strategy. MKUKUTA recognises the importance of economic growth as well as improvements in quality of life and social well-being advances in both economic and human development are fundamental in achieving the outcomes to which Tanzanians aspire.

The average growth rate of 6% per annum since 2000 is historically high compared with the 1980s and 1990s. Nevertheless, this level of growth remains low relative to the rates of 8-10% needed to achieve the income poverty targets of the Tanzania Development Vision 2025 and the Millennium Development Goals. Therefore, the challenge remains to formulate policies and strategies which accelerate and sustain growth.

Several strategic initiatives have been implemented by the government to date to accelerate the rate of economic growth. The Tanzania Development Vision 2025 established the broad parameters and direction for national growth. The five-year MKUKUTA strategy (2005-2010) is narrower in focus - and an improvement over the Poverty Reduction Strategy (2000-2004) - yet it is still too broad. Both Vision 2025 and MKUKUTA have each separately and collectively contributed to growth and improved service provision but their impact has been limited. Therefore, a strongly focused and consistent national strategy that is also highly operational is needed.

The Case for a Growth Strategy

There is growing consensus in Tanzania that to sustain and improve the current GDP growth rates, a more strategic approach to economic growth is necessary. This implies strongly focused, concerted action to accelerate overall economic growth with significant impact on poverty reduction and job creation.

The rationale for a strategic approach to growth is based on the following factors. First, to enable the economy to fully exploit and increase its growth potential, relevant policies and strategies need to be closely aligned. Ensuring that policies are working in harmony towards a collective vision of national development may be as important as the quality of the individual policies themselves. For example, MKUKUTA and other social sector strategies may all be aiming to improve service delivery

in the country, but they may not incorporate specific elements to build the necessary human resources to underpin a defined growth strategy. Without such specific provision, the indicators of social service provision could show good performance at the same time as the economy experiences scarcity of the critical human resources required to support the national growth agenda.

Secondly, selecting interventions that show strong synergies and that are all directed towards accelerating growth is only possible within a limited, well-chosen set of policies. The strategic choice of actions with underlying policies may provide a sound reference framework for private sector activity, and bring non-government stakeholders behind the growth effort.

Thirdly, not all policies have the same pay-off in terms of job creation and poverty reduction. Since public policy initiatives are constrained by limited resources (human and financial), it is logical to select and focus on a limited number of interventions to optimise the allocation and sequencing of public spending.

Fourthly, the effectiveness of public policy in generating economic growth largely depends on the capacity of the private sector to respond in a strong and timely manner. In Tanzania, the domestic private sector is still developing and so deliberate capacity building strategies are needed. Experience shows that hands-on mentoring is needed to address weak private sector capacity. However, capacity building of this nature - supported by appropriate enabling interventions - is unlikely to be possible or effective if spread over many sectors of the economy simultaneously.

Developing a Strategy

The first step in creating a strategic direction for growth in Tanzania is defining the broad vision for the country's development. This is provided in Tanzania's Development Vision 2025 which specifies desired national outcomes: high quality livelihood; peace, stability and unity; good governance; a well educated and learning society; and a competitive economy capable of producing sustainable growth and shared benefits.

The second step is translating this vision into a growth strategy, by providing practical links to available resources and markets. This is done in two sequential stages:

- the identification of drivers of economic growth, and
- the determination of enabling policies and resources (both human and financial) to underpin the selected growth drivers.

Experience has proven that a sound choice of growth drivers is based on a comprehensive analysis of a country's comparative and competitive advantages. And for most poor countries, including Tanzania, comparative advantages will, at least initially, determine the choice of appropriate drivers. This is because competitive advantages - developed over time - depend on an advanced level of technical and managerial expertise, which is currently lacking in most sectors. Other criteria to be considered are scale and impact.

Comparative/competitive advantages need to be sufficiently large to make a real difference in terms of growth. They also need to produce significant impact relative to job creation and poverty reduction.

Based on the comparative/competitive advantages identified together with their scale and impact, a limited set of potential growth drivers can be determined. Sound analysis of each potential growth driver should then be undertaken to assess any existing constraints, which have limited the full potential of these drivers to contribute to national growth. This analysis will help in selecting the priority interventions needed to adjust the broad policy environment and make available the necessary financial and human resources to implement a growth strategy.

In addition to strengthening the overall policy environment, specific policies must be designed to address the constraints faced by the chosen growth drivers. Consistent with the overall spirit of maintaining macroeconomic stability and reducing the cost of doing business in Tanzania, liberalisation can be contextualised within specific areas of the local private sector, including selective protection for nascent enterprises. Targeted policy initiatives will also likely focus upon improvements to infrastructure such as communications, transport and utilities as they relate to the growth drivers identified.

Specific human and financial resources will also be required by the growth drivers. For the development of human resources, the broad-based provision of essential health and educational services must be ensured so that the population can take full advantage of the opportunities arising from economic growth. At the same time, a clear and proactive direction for skills development is required related to areas of growth, for example, science and technology. Thus, if the textiles industry was chosen as a growth driver, adequate resources would need to be provided to develop a cadre of textile technologists able to support the growth of this industry within the highly competitive global marketplace. For example, the use of innovative technology could enable Tanzania to take advantage of niche or high-end markets.

Financing a growth strategy can be problematic for countries highly dependent on external resources. Domestic and donor perspectives may differ on the growth strategy and its implications for national development, the selection of growth drivers, and the policy adjustments required, as well as the implications of all of these choices on budget allocations. For example, when external resources are a substantial proportion of a government's budget, priority may be given to provision of public goods, indeed, basic education and health services have been especially favoured in recent aid programmes. But, in these circumstances, the necessary support for a prioritised growth strategy, based upon building the capacity of the private sector, may go under resourced.

Deriving Growth Drivers

As stated earlier, the identification of growth drivers must be based on a comprehensive analysis of a country's comparative/competitive advantages together with their scale and impact.

Comparative and Competitive Advantages

Comparative advantage refers to the ability to produce and deliver goods and services for a given market at a relatively lower cost. Comparative advantages are usually based on the availability of natural resources that confer a relative or absolute cost advantage, combined with access to markets (domestic or international) that absorb the production.

Competitive advantages usually refer to comparative advantages that are not built on the availability of natural resources, but on other aspects of competitiveness such as productivity, quality, and diversity, which require accumulation of a new and more sophisticated set of resources.

Comparative advantages, therefore, are more associated with exploiting initial conditions in the short to medium term, whereas competitive advantages require medium to longer-term development of capabilities, including markets, technology, physical and human assets and norms and institutions.

Consideration of markets must include both domestic and international markets, since domestic markets alone are unlikely to support economies of scale (that increase cost competitiveness) and strong national growth. This partly explains why an import substitution strategy that focuses on exploiting the domestic market may not be a viable option in the present context in which globalisation is driven by liberalisation and locates the local market within the global market/economy. Identification of comparative/competitive advantages, therefore, requires a thorough analysis of national resources (actual and potential) and matching output markets.

Chile, Ireland and Jordan provide examples of countries with successful growth strategies (see below). All three countries have significantly raised their per capita incomes during the last thirty years. Between 1976 and 2005 Ireland's per capita income rose sixteen times from USD 2,560 to USD 40,150; Chile's rose six times from USD 1,050 to USD 5,870 and; Jordan's rose four times from USD 610 to USD 2,500 (World Bank, 1976 and 2007).

Growth Strategies of Chile, Ireland and Jordan

Chile

Chile identified agriculture as the key growth sector, and western markets in the northern hemisphere as the key markets. Initially and in the short-term, Chile's growth strategy was built upon its ability to provide off-peak produce to these markets, thus avoiding the notorious agricultural trade barriers set by western countries. To build a stronger competitive advantage, Chile focused on a number of key competitive assets, such as agricultural research and development to diversify and adapt production for its target markets and first-class logistics to ensure timely delivery of fresh produce.

Ireland

Ireland was one of the poorest, mainly rural, countries in Europe. Historically, it experienced a tremendous loss of its labour force through emigration. Ireland identified its young, educated and English-speaking population as a key resource, with membership in the European Economic Community providing access to one of the world's largest markets. Given the country's lack of an industrial base, the government focused efforts on attracting foreign direct investment (FDI) mainly from American companies in the service industry, which could utilise Ireland's human capital. The longer-term vision was to build competitive advantages by attracting high-tech FDI and establishing high-tech industries as a key sector of the national economy.

Jordan

Jordan is a small, quasi land-locked, mostly desert country in the Middle-East. It has very little water and produces no oil. Given its lack of natural resources and relatively remote location, the country decided to build competitive advantage on its human capital by investing heavily in all levels of education. Economic development focused principally on information technology, service industries and light manufacturing. In addition, the country negotiated to be part of free trade agreements with Arab countries, the European Union and the United States, giving companies in Jordan access to a market of around 1 billion people.

Using the criteria for assessing comparative and competitive advantages (and hence growth drivers) outlined above, a simple matrix can be developed to map the competitive/comparative advantages for Tanzania (see Table 23).

Table 23: Matrix of Current and Future Comparative/Competitive Advantages for Tanzania

Current Advantages		Future Advantages	
Resource Advantage	**Potential Market**	**Resource Advantage**	**Potential Market**
Agricultural land	Domestic market	Agricultural land	Asia & Europe
Specific ecological conditions	Europe	Specific ecological conditions	Europe
Geological conditions	Europe & N/America	Geological conditions	Europe, N/America & Asia
Tourism resources	Europe & N/America	Tourism resources	N/America, Europe & Asia
Geographical position	East/South Africa	Geographical position	East/South Africa & Asia
		Competitive labour costs	Asia
		Logistics hub	Asia and Africa
		Technology based manufacturing and services	Asia and Europe

Scale and Impact of Potential Growth Drivers

Direct Effects

Economic growth is particularly valuable in as far as it creates jobs and/or generates broad-based improvements in income. In these ways, growth has the capacity to directly impact the livelihoods of a large portion of the population and contribute to poverty reduction. This implies that sectors that are limited in scale, or which are large in scale but not labour intensive, may not be prioritised by the growth strategy.

The potential scale of a sector is determined both by the size the resource base and the markets for its output. In Tanzania, for example, questions may be raised about the potential scale of new sectors such as horticulture. Given the resource base (suitable land and natural resources) and market potential, what is the scope for expansion? And can the sector sustain positive rates of growth in the medium to long term?

With respect to job creation, the direct impact of growth can be extrapolated from current sector trends, both at the domestic and at the international level. For example, the formal mining industry is highly capital intensive and import intensive (in non-industrialised countries) and, therefore, creates relatively few local employment opportunities.

Indirect Effects

The indirect effects of growth in one sector on other sectors in generating jobs and growth are more complex to analyse. Input-output techniques can be used to calculate the indirect effects of a sector on GDP and labour multipliers in the rest of the economy. Thus, for instance, a sector could employ limited labour directly but utilise large amounts of locally sourced intermediate goods and services which are labour intensive to produce. This may well be the case for agro-processing and even mining. However, the use of input-output data, which quantifies current and historical trends, needs to be interpreted against projections of future developments, which may affect specific input-output coefficients.

Bunching and Time Dimensions

Bunching and time dimensions also need to be considered in the selection of growth drivers. For example, an individual growth driver may not have a large-scale impact in isolation, but assessed in association with other related activities, the cluster of activities may have significant impact on the economy. Therefore, it may be important to select a cluster of growth drivers or market niches that operate in concert and collectively offer large potential to impact overall growth. Furthermore, some growth drivers may have a relatively small effect but are able to deliver this effect quickly. These drivers may serve as the ignition for Tanzanian growth, enabling rapid growth in the short term and assisting to establish a track record of success and trust in the economy for the medium term.

Implications for the Choice of the Growth Drivers for Tanzania

Tanzania's comparative advantage is derived from its large natural resource base, more specifically the country's geographical location, ecological and geological conditions, biodiversity and unique landscapes. To begin, Tanzania is well positioned on the coast to provide transport services for landlocked neighbouring countries. In addition, the country is endowed with tourist attractions only to be found in Tanzania, including Mount Kilimanjaro, Ngorongoro Crater, Serengeti National Park, Zanzibar and Saadani (which uniquely combines wildlife with beach), plus a host of other natural reserves throughout the country. Finally, Tanzania's ecological conditions are suitable for production of a wide range of agricultural outputs and the country possesses a diversity of rich mineral deposits.

Most Tanzanians believe that the country's comparative advantage is derived from its cheap labour, but this understanding is based on the erroneous assumption that the abundance of labour provides an advantage in the global labour market. However, when the current quality of that labour is considered, Tanzania's labour no longer qualifies as cheap. In production processes, the quality of labour (based on levels of education, skills, experience and discipline) determines the productivity and opportunity cost of this key input, i.e. the real cost labour is dependent on actual productivity. Currently the majority of Tanzania's labour is of low quality; hence cheap labour can not be a source of comparative advantage for the country.

Taking into consideration all of the criteria for selection of growth drivers, the following drivers are indicated for Tanzania (Table 24).

Table 24: Potential Growth Drivers for Tanzania

Potential Growth	Comparative Advantage	Scale and Impact
Transport services for landlocked neighbours (Rwanda, Burundi, Congo, Zambia & Malawi)	Geographical position	Infrastructural development would have strong linkages to other activities and is strongly supportive of a broad-based enabling environment. It could also generate employment.
Tourism	Biodiversity and landscape	Could be developed with stronger linkages to local producers. It has proven employment potential in different parts of the country. Infrastructural developments would be supportive.
Horticulture	Ecological conditions	Quality standards are likely to require large investments. This sector may require time to achieve significant scale and impact.
Mining	Geological conditions	Currently producing significant growth, and scale could be expanded. Yet deliberate linkages would need to be made with other sectors to exploit the sector's full employment potential.

With regard to agriculture, Tanzania once possessed comparative advantage in producing a large range of agricultural outputs. However, much of this advantage has been subsequently lost through changes in global agricultural production and market parameters. For example, Tanzania has lost ground in export markets for traditional crops such as cashews and coffee due to higher productivity in Asia and Latin America. The possibility of organic production for niche markets remains. However, this sector is unlikely to offer sufficient scale for it to qualify as a priority growth driver. In addition, the level of mentoring required for farmers is high and the current policy drive towards intensive use of inorganic fertilisers would have to be reconsidered. Moreover, Asia and Latin America may outperform Tanzania in this niche sector given their existing competitive edge in agriculture overall, that has been made possible by technological advances not yet attainable in Tanzania. The point is that comparative advantage is not a static concept; it changes with time.

For the same reason, manufacturing may not feature in the initial phase of Tanzania's growth agenda. This analysis recognises that competitive advantage can be gained by moving up the value chain, but achieving competitive advantage represents a second stage development of linkages which enhance and consolidate gains made in the initial phase. The manufacturing sector requires a technically skilled labour force, which is currently unavailable in Tanzania and more readily available in more competitive economies. In the initial growth phase in Tanzania, it presents as more logical to give priority to growth drivers which use current resources and have the capacity to generate greater benefits for a larger population. Over the medium to long term, however, as technical and managerial skills develop, competitive advantage can be gained not only through drivers selected for the initial phase but also by bringing in new growth drivers and moving up the value chain.

The identification of potential growth drivers based on Tanzania's current comparative advantages raises two further issues that need addressing before a final selection is made. The first issue relates to the synergy and complementarity among growth drivers and between the drivers and the rest of the economy. This is referred to as 'horizontal synergy'. Given limited resources and the need to achieve maximum impact and scale, priority should be given to growth drivers that strongly reinforce each other. Thus, if resources were available only for one growth driver, then transport services would be chosen because of its central role in facilitating other growth drivers and the rest of the economy.

The second issue relates to the potential for developing competitive advantage in the medium term - the 'vertical' or 'temporal synergy'. Planning for future vertical synergy is important because increases in per capita incomes cannot be achieved and sustained without the involvement of manufacturing and services. Therefore, the choice of drivers based on shorter-term comparative advantages must also take into account their potential linkages with longer-term competitive advantages. Drivers in the initial phase should work towards putting in place key components of a 'competitive advantage' growth agenda. For example, vertical synergy operates well in the case of transport services and logistics because the hub effects these sectors can create are very supportive of manufacturing development if a supply-chain logistics approach is taken. The planning of capacity building efforts to support future competitive advantages must be considered urgent and immediate.

The selection of growth drivers implied by this analysis also leads to discussion of 'growth centres', otherwise known as 'growth poles', a concept which has lost support in recent years due to equity concerns. This concept advocates clustering of investments in specific geographical areas based on the assumption that scale and concentration interact to generate greater growth and impact; in other words, the size of the multiplier increases with the scale of operations. Smaller and thinly spread investments/operations generate limited employment, incomes and spending.

Conversely, other things being equal, large and concentrated investments generate significant employment, incomes and spending. For example, a large-scale investment that creates 100 jobs and generates additional income and spending for 100 households is likely to encourage the establishment of additional services, such as dispensaries, food and beverage outlets, a day-care/ nursery school, and places of worship for employees. In turn, this may generate a second round of employment opportunities, incomes and spending in the locality, which encourages a third round. And so on.

Such expansion, however, is unlikely to be generated by a small project which creates, for example, only 5 jobs and additional income for 5 households. In this case, development is likely to be limited to the first round of investment. Therefore, countries can seek to increase the multiplier by adopting a selective 'growth pole' policy. Concerns about equity implications of the policy are based on the false assumption that opportunities follow people. Yet practice shows that the reverse is true: people follow opportunities.

In Tanzania, the natural resources with the highest potential for increasing the country's comparative advantage are clustered in specific geographical areas. The choice is between exploiting these advantages for higher and sustained growth, or spreading investment thinly across the country for lower and unsustainable growth. By choosing the latter course, Tanzania also risks losing existing comparative advantages as a consequence of inadequate investment in strategic locations and

sectors. For example, Tanzania's comparative advantage in supplying transport services to landlocked neighbouring countries may disappear if one of the other nations along the coast adopts a similar growth strategy but allocates resources more quickly for its implementation.

An Enabling Environment for Growth

Promotion of an enabling environment for strong economic growth necessarily extends beyond macroeconomic stability, good governance and liberalisation. A strong growth strategy must also aim to maximise the benefits and minimise the costs of implementation. For example, implementation of a growth strategy should not result in the collapse of incomes in sectors and activities not directly chosen as drivers of growth, unless a natural process of absorption into higher productivity activities has occurred. If a growth agenda leads to serious income losses among some groups in society, such a strategy would lose public support as well as undermine the credibility of politicians. Any strategy, therefore, must ensure that incomes rise for as many groups as possible, while accelerating the rate of growth via the selected growth drivers. It is critical to underline that, choosing specific growth drivers does not imply relegation of other sectors or activities.

In addition, an enabling environment overall has to be created to support sector linkages so that the selected growth drivers can provide positive spillover to other key sectors of the economy. The government should continue to promote macroeconomic stability, good governance and liberalisation with the objectives of reducing the cost of doing business in Tanzania and minimising rent seeking associated with the implementation of regulations, licences, etc. Furthermore, the provision of good quality, broad-based, basic education and health services should continue. This will enable individuals to take full advantage of opportunities arising from economic growth. But investment in essential services must be carefully planned, and macroeconomic stability must not be sacrificed in the process.

Technical expertise and innovation should also encouraged, and the successes of some privatised companies - in banking, telecommunications, breweries, and agriculture to select a few examples - should be examined to determine if they can be replicated in other parts of the economy. In agriculture, while Tanzania may have lost ground in markets for some traditional crops, future opportunities may present by strategically positioning Tanzania within global value chains to take full advantage of technological developments made elsewhere. Active policy support is necessary to encourage organisational innovation that will enable farmers to integrate into global value chains. Integrated producer schemes in the tea and sugarcane industries have managed to raise the productivity of smallholders, providing valuable evidence that foreign direct investment working closely with the domestic private sector in an enabling policy environment can promote knowledge and innovation for increased productivity and incomes.

Lastly, the roles and responsibilities of supportive institutions during different phases of the growth strategy should also be considered. Developing a strategic growth agenda may require a specific institutional framework, which is then complemented by another framework to sell the strategy and mobilise support, and yet another framework for implementation and monitoring of the strategy. Establishing a single institutional framework is unlikely to suffice in all phases of the process. Flexibility is crucial to allow change to take place. All too frequently, institutions become rigid and unable to adapt to evolving demands and circumstances.

A Final Note on the Selection Process

As described in this chapter, the successful development of Tanzania's growth strategy and the selection of growth drivers must be based upon sound and comprehensive analysis. Although this work is technical in nature, the knowledge to attain these objectives cannot be possessed by any single individual or organisation. An interactive and consultative process involving all key stakeholders in the economy is, therefore, vital for achieving the best possible outcomes.

However, a consultative process can be expensive and, at times, self-defeating, especially when it is not analytically driven. This may happen when discussions become an end in themselves rather than concrete steps towards achieving desired outcomes. Such consultations are often not sufficiently focused, and can exhaust considerable time and resources by striving to include unmanageable numbers of groups within society. As a consequence, a very broad agenda may be developed to satisfy the interests of the many groups involved. In sum, this type of consultative process will not lead to the desired result of designing a focused national growth agenda.

The question then is how to manage the process and still achieve a focused result given the diversity of interests in Tanzanian society. Experience shows that strong political will and leadership is important from the outset. Overt signals from the government must be shown in favour of an analytically driven growth agenda which supports Vision 2025. In the absence of clear signals from the top leadership, specific group interests will likely fill the vacuum and dominate the agenda at the expense of an analytically driven process. Given the overriding national desire for high levels of growth that benefit Tanzania's development, high level support is essential to establish and maintain a disciplined and credible process for developing a strongly focused and consistent growth strategy.

Conclusion

This chapter aims to initiate discussion about strategic choices for accelerating and sustaining broad-based growth in Tanzania. It argues that Tanzania's growth strategy must be developed within the global context and makes the case for a more focused growth strategy based on the natural resources that give Tanzania unique advantages over other countries. At the same time, it recognises that the country currently has a shortage of skilled labour and, therefore, cannot choose high-skill intensive activities, at least over the short to medium term.

The growth strategy focuses instead on Tanzania's comparative advantages of geographical location, landscape and biodiversity, and ecological and geological conditions. Transport services to landlocked neighbours, tourism, horticulture and mining emerge as obvious choices for growth drivers. Agriculture is more likely to be a beneficiary of other drivers rather than a leading growth driver itself due to the low-skilled labour force domestically and the strong competition for markets internationally. In recent decades, Asian and Latin American countries have significantly increased productivity and now have competitive advantage over Tanzania. For similar reasons, skill-intensive manufacturing is excluded from the selection of growth drivers over the short run.

Providing transport services to landlocked neighbouring countries will necessitate improvements in transport infrastructure, including port facilities, railways, roads and air transport. However, the expansion of transport infrastructure and services will produce significant direct and indirect growth effects. 'Transport services', therefore, not only represent a growth driver but will also be an enabling factor for the other growth drivers selected. Given resource constraints, 'transport services' is the first recommendation for a national growth driver. It has a high level of complementarity with other growth drivers and the rest of the economy as well as strong potential for building future competitive advantages.

Tourism also has enormous impact potential, especially if backward linkages are developed which establish activities that supply quality goods and services. Currently, the hotel and transport sectors are fairly import intensive. In addition, horticulture has potential as a growth driver. However, the initial scale and impact of this sector may cast doubt on its selection; and achieving quality standards may require large investments. Mining has significant impact potential if concerted efforts are made to develop the domestic supply of quality goods and services to the mining sector; currently most of the goods and services utilised by the mining sector are imported.

This chapter also contends that choosing a few growth drivers and concentrating investments in a few geographical areas would produce higher and more sustainable growth than to spread resources over many activities/sectors and large geographical areas. It is further argued that the policy of selective 'growth poles' does not necessarily lead to growing inequality, because evidence has shown that people follow opportunities.

Underlying the choice of growth drivers is the need to strengthen the enabling environment for business in Tanzania. Four important elements were identified in promoting an enabling environment:

i. Macroeconomic stability, good governance and reducing the cost of doing business so as to support sector linkages and facilitate positive spillover from growth sectors to the rest of the economy;

ii. Human resource development to fulfil the requirements of the growth drivers;

iii. Promotion and replication of good practices in Tanzanian businesses that are strategically positioned within global value and technological chains in order to facilitate the use of technical expertise and innovation in the local economy; and

iv. Flexible and supportive institutions for facilitating change.

Finally, the contribution of all sectors of the economy and all groups within Tanzanian society is vital for accelerating and sustaining growth and reducing poverty. This implies the strong involvement of other sectors and activities not specifically selected as growth drivers, rather their relegation.

CHAPTER 10

Managing Water Resources to Enable Growth

This chapter analyses water resources in Tanzania and re-positions the national water supply as a growth enabler. It argues that water usage needs to be aligned with the country's growth strategy, and emphasises the need to prioritise the strengthening of water management and infrastructure in Tanzania's nine river basins.

Introduction

Historically, the performance of the Tanzanian economy has largely been a function of rainfall availability because the nation's key economic sectors rely directly or indirectly on water resources. The critical importance of an adequate water supply was highlighted in the decline in real GDP growth from 6.7% (2005) to 6.2% (2006) which in part was attributed to severe droughts during the 2005/06 rainy season. During this period, the crop sub-sector experienced nearly a 20% fall in growth (from 5.2% in 2005 to 4.0% in 2006), while growth in electricity and water sectors declined from 5.1% to -1.8% in 2006.[62]

Given this situation, this chapter focuses on the management of water resources for socio-economic development. The case is made that Tanzania has considered water as a scarce resource for far too long. Indeed, the opposite is true: the country has an adequate supply of water resources to support the requirements of all users. However, a national planning approach that incorporates all of Tanzania's nine river basins is needed that matches water potential to water requirements, and is backed by adequate infrastructure and institutional development. Moreover, this alternate view posits the disputes in utilisation of water resources commonly experienced in recent years as arising primarily from weak management and inadequate infrastructure in water basin areas.

An Overview of Water Resources in Tanzania: Scarcity Amid Abundance

Overall, Tanzania is blessed with abundant water resources. The country shares three of the largest freshwater lakes in Africa with neighbouring states, and according to Food and Agriculture Organization (FAO), Tanzania had 2,466.9 and 2,291.2 m^3 per capita of renewable water resources for 2006 and 2007 respectively.[63] In addition, the National Irrigation Master Plan estimates that current levels of water use require less than 1% of the total rainfall received annually (see Table 25). However, despite this aggregate sufficiency in water supply, widespread water scarcity prevails. There are three reasons why this is the case.

62 URT. (2007). The Economic Survey 2006. The Domestic Economy http://www.tanzania.go.tz/economicsurveyf.html

63 A country with renewable water resources below 1000 m^3 per capita is defined as 'water scarce'. Assuming current levels of population growth, renewable water resources in Tanzania by 2025 are predicted to drop to 1,500m^3 per capita per year.

Table 25: General Water Balance[64] in Tanzania Mainland
(Annual Mean Supply (million m^3)

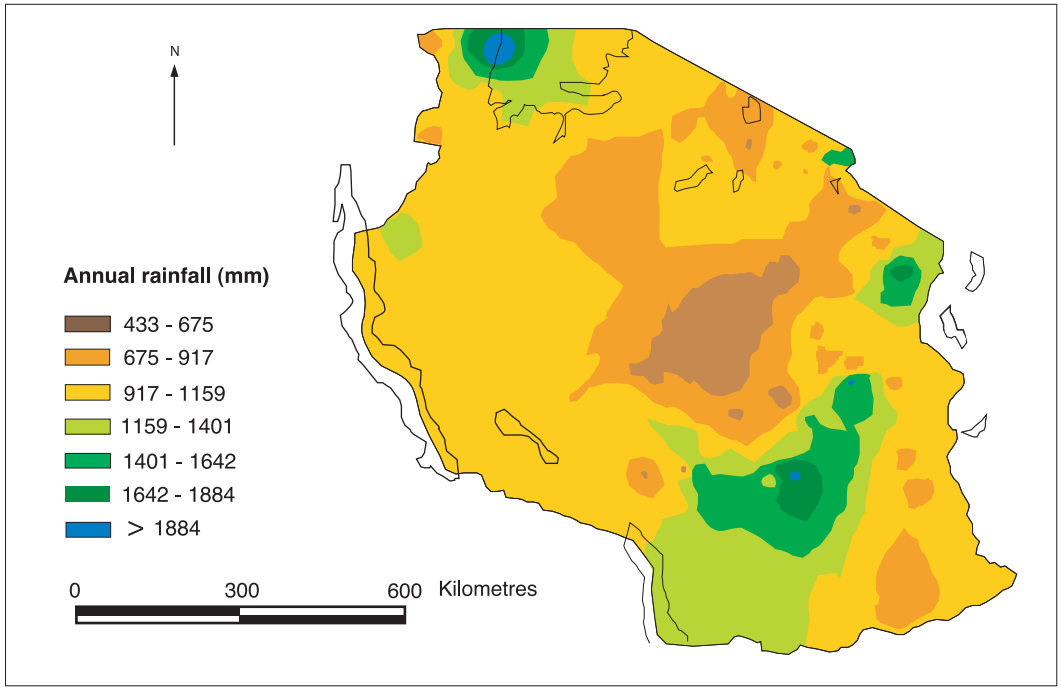
	Inflow	Outflow
Rainfall	921,032 100%	
Evapo-transpiration		827,313 89.8%
Runoff (into lakes and oceans)		89,530 9.7%
Ground water recharge		3,725 0.4%
Water use (domestic, irrigation and livestock, (excluding non-consumptive uses)		5,116 0.6%

Source: URT, 2002 National Irrigation Master Plan. Main Report

First, Tanzanian water resources are unevenly distributed, both in time and location. Some parts of Tanzania receive over 1,600mm of rain annually while the central dry sections of the country receive around 600 mm (see Figure 26). This spatial and temporal variability in water supply creates localised and intermittent shortages which in some cases limits economic activity. In light of population growth and climate change projections of increasing variability, the current shortages are cause for concern. Left unchecked, intermittent and localised shortages may worsen to limit production year round. The uneven distribution of water is not, however, the main reason for shortages. Rather, the current inadequacies in national capacity to manage water resources significantly underlie shortages and user conflicts.

64 Water balance refers to the quantitative representation of water inflows and outflows in a particular area in any given time. Water balance is calculated from mean annual rainfall, estimate groundwater recharge, run-off data and current levels of water use. For Tanzania, inflow was equated to total annual rainfall and outflows calculated from runoff, groundwater recharge and evapo-transpiration

Figure 26: Map of Annual Rainfall in Tanzania



Source: Ministry of Water, Water Resources Division, 2005

The second reason for water scarcity is inadequate water storage capacity. Tanzania has not been able to satisfactorily harness its water resources to achieve water security[65], in part because of the lack of strategic, multi-purpose, artificial (man-made) water storage facilities (World Bank, 2005). Currently, the country has 22 reservoirs. However, apart from several large reservoirs built to regulate flows for power generation (e.g. Mtera and Nyumba ya Mungu), most other dams have small installed capacity (between 0.5 - 2.5 million cubic meters). Given this limited storage infrastructure, rain water is allowed to quickly run-off and, as a result, Tanzania is not able to safeguard against variability and unpredictability in water supplies and reduce the duration of dry spells.

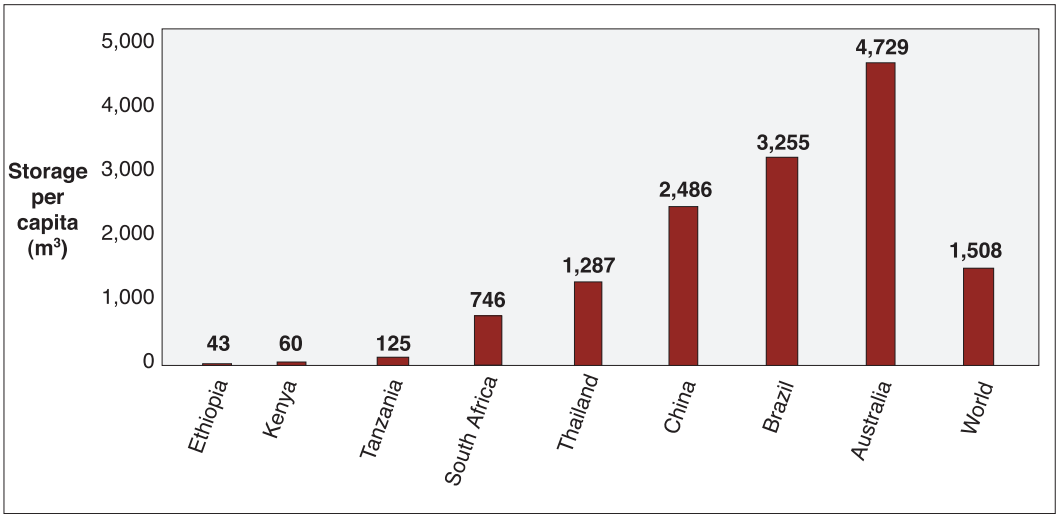
Although Tanzania has plenty of natural storage in the form of perennial rivers, lakes and groundwater, these are inaccessible to large segments of the population. The failure to strengthen the infrastructure for harvesting and storing water, therefore, decreases the availability of an otherwise abundant water supply. Resulting shortages have led to increased socio-economic pressures and sometimes conflicts among users particularly during prolonged dry periods.

In contrast, other countries that face similar unpredictability in rainfall have invested heavily in multi-purpose storage facilities and, consequently, they are able to better handle adverse conditions (see Figure 27). Indeed, expanding water storage continues to be the main strategy employed by these countries to meet increased water needs arising from population growth, weather variability and the demands of water-dependent productive activities. In growing economies such as China investing

65 Water security is defined as the reliable availability of acceptable quantities and quality of water for production, livelihoods, health combined with levels to mitigate risks caused by unpredictable weather.

in multi-purpose storage capacity has become a high priority in recent years. For example, in 2005, China increased its man-made storage capacity through large and medium reservoirs by about 12.4% (P.R.C. Ministry of Water Resources, 2005).

Figure 27: Water Storage per Capita for Selected Countries [66]



Source: Adapted from World Bank 2005

The third reason underlying the problem of water scarcity nationally relates to the institutions that manage the country's water resources. In Tanzania, Basin Water Offices (BWOs) are responsible for coordinating water utilisation as well as enforcing standards in relation to pollution, water source degradation and trans-boundary management. However, these offices were only recently established and require significant capacity building to overcome institutional weaknesses. The management challenges faced by these water authorities are discussed in the following section.

Tanzania's River Basins: Water Uses and Management Challenges

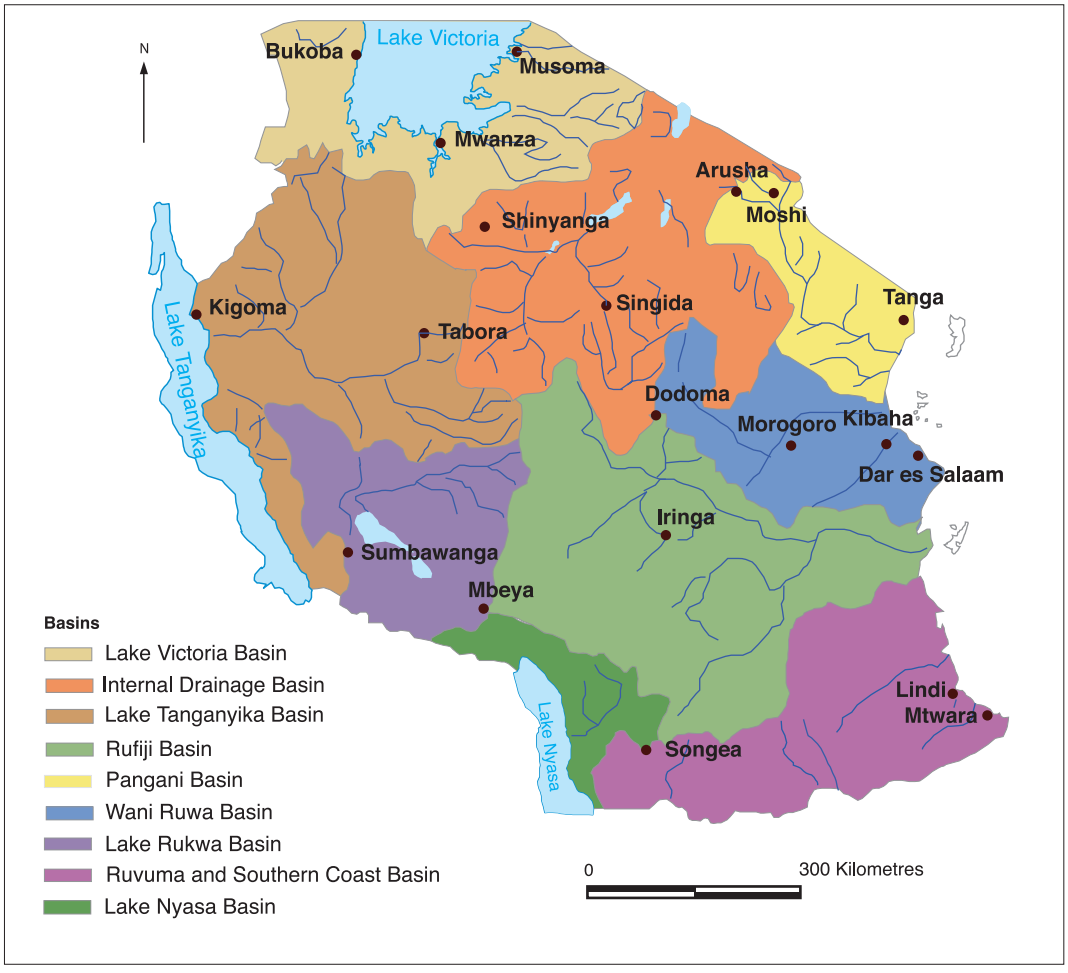
Tanzania's water resources are divided into nine river basins for the purpose of planning and management (see Figure 30). Each basin has a central Basin Water Office responsible for:

- Coordinating the planning and utilisation of water resources;
- Collecting date for water resource assessment and monitoring;
- Issuing water use and discharge permits as well as enforcing regulations and revoking permits if necessary;
- Fostering cooperation between sectors at the local level, and
- Resolving conflicts and coordinating stakeholders.[67]

66 The figure for Tanzania is estimated by adding up the installed capacities of main reservoirs of Mtera, Nyumba ya Mungu and dividing this figure by the total population. Figures were provided by Water Resources Management Department - Ministry of Water
67 Ministry of Water and Livestock Development, 2006

A summary of water potential and management challenges for each river basin is included at the end of this chapter. All nine basins experience considerable management challenges, and user disputes are becoming common in many areas during dry seasons.

Figure 28: River Basins in Tanzania



Source: Ministry of Water and Livestock Development, Water Resources Division

Basin Water Offices were recently established as part of ongoing reforms in the water sector. Offices for Rufiji and Pangani river basins began operating in the 1990s; all others commenced operations after 2000.[68] Most offices are still young and have serious institutional weaknesses - technical, administrative and financial - to perform their functions adequately (Ministry of Water and Livestock Development (MOWLD), 2007). For example, Basin Water Offices are responsible for coordinating the planning and utilisation of water resources, but currently they face considerable operational and informational constraints including: inadequate basin-wide hydrological information; limited inventory of informal and formalised water users with customary and formal water rights; infrequent comprehensive development plans to support monitoring of water use and guide investments along

68 Pangani River Basin(1991), Rufiji River Basin (1993), Lake Victoria Basin (2000), Ruvu/Wami River Basin (2002), Lake Nyasa Basin (2002), Lake Rukwa Basin (2003), Internal Drainage Basin (Lakes Eyasi, Manyara, Natron and the Bubu depression) (2003), Ruvuma River and the Southern Coast Basin (2004), Lake Tanganyika Basin (2004).

the basin; and weak human resource capacity. The offices also face the complex task of undoing the cumulative impact of past uncoordinated sectoral and local water resources utilisation (see below).

Even in Rufiji Basin where a central development institution has been established since 1975 to coordinate multi-sector development, similar problems persist. Capacity constraint and institutional positioning of the Rufiji Basin Development Authority (RUBADA) have resulted in a sectoral focus on resource development rather than a multi-sectoral basin-wide view of resource development. In addition, RUBADA has shifted between several government ministries since its establishment; from the former Ministry of Development Planning to Ministry of Energy, back to Development Planning, and most recently to the Ministry of Agriculture, Food Security and Cooperatives in 2005. These transfers may have echoed changing national priorities over this time but they also introduced sectoral bias into the planning and utilisation of water resources.

Water Use and Management Challenges:
Examples from Pangani and Rufiji Basins

Pangani Basin: Power Generation versus Small-Scale Irrigation

Electricity generation at the New Pangani Falls (NPF) power plant appears to be constrained by decreasing water inflows. In turn, the decreasing inflows are due to the combination of less rainfall and increased abstractions upstream from the plant due to irrigation. Nyumba ya Mungu Reservoir was built in 1968 to regulate the flow for hydropower production and other downstream uses but since its establishment the increased abstraction both upstream and downstream of the dam has reduced flows into NPF. At the time of construction, water available for electricity production was estimated at 800 million m^3 but recently this dropped to 600 million m^3. Blame has been directed at small-scale irrigators with customary water rights and the lack of capacity of water institutions to monitor abstractions. Table 26 shows power generated at NPF decreased between 1995 and 2000 with generation expected to fall further over the long term.

Table 26: Power Generation for New Pangani Falls Power Plant

Year	Average Energy GWh/year	Random Energy GWh/year
1995	367	54
2000	353	56
Long Term	321	62

Sources: Andersson et al. (2002), International Union for Conservation of Nature and Natural Resources (2003)

Pangani Basin:
The Lower Moshi Irrigation Scheme - Conflict Among Rice Farmers

Before the Lower Moshi Irrigation Scheme (LMIS) was developed in 1987, few rice paddies were irrigated and farmers could expect to harvest about 2 tonnes of rice per hectare (ha). Following completion of the scheme, yields increased to 8 tonnes per hectare, prompting farmers outside and upstream of the project to replicate the scheme's farming techniques. As a result, water demands increased substantially, causing chronic water shortages downstream of the LMIS. Moreover, the scheme itself has suffered from water shortages due to increased abstractions upstream, and has been forced to reduce the area under irrigation from 2,300ha in 1987 to 647ha in 1994. Farmers involved in the scheme were very unhappy. These farmers explained that their

water allocations followed a well planned programme, unlike upstream users who had no such programme but had been granted water rights despite the foreseen impacts on the LMIS. Farmers within the scheme claimed that upstream users had influence within government circles, so they could not be challenged.

Source: Mujwahuzi (2001)

Rufiji Basin: Hydropower Generation, Irrigation and Pastoralist Activities

Rufiji Basin comprises the Great Ruaha, Kilombero, Luwegu and Rufiji rivers with 15%, 62%, 18% and 5% of total basin runoff respectively. Over the past decade the once perennial Great Ruaha River has turned seasonal and, since 1993, the river dries up for several weeks of the year. The Great Ruaha case study is a good example of competition between water users: between upstream farming, predominantly irrigated rice production, and downstream environmental needs (wetlands and a National Park) and hydroelectric power generation.

From the early 1990s, it became clear that with each passing year, the water that reaches Ruaha National Park from the Usangu water catchment was decreasing. The drying up presents a serious problem to wildlife in the Ruaha National Park. Also downstream, the Mtera Reservoir collects water from the Great Ruaha and a number of other rivers including the Little Ruaha, Kisigo, Bubu, Fuifu, Mwega, Lukosi, and Yovi rivers. Besides having an 80 MW generating capacity, the Mtera Reservoir acts as a regulating reservoir for the larger 204 MW Kidatu hydropower scheme further downstream.

The Usangu water catchment area has experienced increased pressure from rice irrigation even in dry seasons and an influx of large cattle herds by pastoralists from Sukumaland. Studies have found that the Great Ruaha was drying up due to abstractions due to expanded irrigation during the dry season and not due to climate change. Scientific investigation, however, has shown that it is possible to restore the perennial flow of the Great Ruaha River without reducing rice production, through a combination of improving irrigation efficiency and synchronising planting. Expert opinion also acknowledges that the increasing number of pastoralists in Usangu has caused wetland degradation, but official reports do not associate the degradation with the water crisis at the Mtera Reservoir although popular opinion (news and print media) does. The power crisis of 2006 resulting from low water levels in the Mtera Reservoir is a classic example of conflicts in usage of water resources. At the peak of this dispute, pastoralists were relocated from the Usangu catchment to other areas along the Rufiji Basin and Ruvu/Wami Basin as one strategy to reduce water stress along the Great Ruaha River.

Sources: World Bank, 2006; Lankford, 2004; Sustainable Management of Usangu Water Catchment (SMUWC), 2002

The examples given above clearly illustrate that, even in areas of high water potential, water resources need to be efficiently and effectively managed to support services and productive activities. Institutional weaknesses coupled with inadequate infrastructure exacerbate perceptions of water scarcity. To date, water authorities have perpetuated an approach to management and utilisation practices which has led to the impression that users (various services and productive activities) must compete for allocations. For example, the debate about irrigation and pastoralists activities upstream from Ruaha National Park highlights the importance of carefully weighing the evidence, objectively addressing the challenges, and devising long-term solutions for water use which are not clouded by popular opinion and the strategic actions of a few interest groups. Overall, this example illustrates the key point that it is possible for various users to be accommodated if the planning and allocation of basin-wide water resources is better managed.

Water as an Enabling Resource for Growth

Improvements in water security are necessary to satisfy the water needs of all users and to stimulate economic growth, and the case for better management of water resources is clear. Yet the details of what investments should be made to reap the greatest benefits require careful consideration. A step-by-step analysis is recommended beginning with an assessment of potential water resources for different water uses and the scale at which these activities can be supported, followed by a process of aligning the water resources identified to user requirements.

Matching Potential Resources with Potential Uses

Water resource assessments are vital because they provide a framework that matches water potential with the full spectrum and scale of activities/uses. The first comprehensive assessments in Tanzania were carried out in the 1970s to produce Regional Water Master Plans. A second major assessment was conducted in 1995. This was a rapid assessment but provided an outline of the potential and direction for water management issues in every river basin (URT, 1995). Lastly, other basin-level assessments were undertaken in Rufiji and Pangani as part of the World Bank funded River Basin Management and Small Scale Irrigation Improvement Project.

All of these assessments are valuable for identifying potential uses for each basin, informing the institutional requirements for water resource authorities, guiding water allocation, and providing a basis for monitoring utilisation. In addition, sectoral assessments have been carried out for irrigation and electricity generation, as well as environmental assessments for ecosystem integrity in the Pangani, Rufiji and Ruvu/Wami basins. However, these more focused assessments need to be placed within the basin-wide context to ensure an equitable balance of interests that avoids bias and conflicts.

Building on data from the research to date, each Basin Water Office (BWO) needs to develop a basin-wide strategy for allocating and ensuring the replenishment of water resources. Taking a basin-wide view will allow BWOs to assert their coordinating role and enable users to understand water issues beyond their local administrative boundaries. The integration of sectoral requirements and environmental needs, as well as the interaction of upstream and downstream use of water resources, clearly call for strategic basin-wide planning. Basin-wide plans should provide a point of convergence for all sectoral plans and water requirements and a framework for the issuing of water use permits and thus water allocation.

Aligning Water Resources to Support Economic Growth

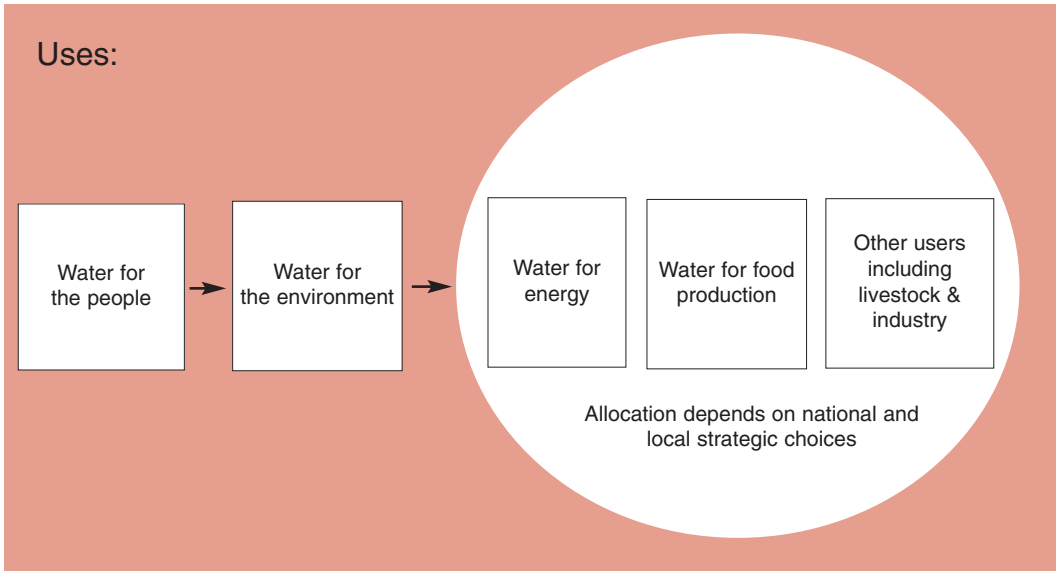
Chapter 9 of this report makes the case for a prioritised national growth strategy. It recommends that the development of such a strategy should be based on analysis which identifies the opportunities and constraints of potential growth drivers for Tanzania, and then selects a limited number of drivers for priority investment. Water is likely to be a key enabler for whichever growth drivers are chosen. Therefore, water basin offices need to take this into full consideration when undertaking their basin-wide assessments and devising water resource strategies. In this way, regional water strategies will closely link to, and align with, the national growth strategy thereby ensuring complementarity and the contribution of the water sector in enabling growth and reducing poverty.

Ensuring that water basin strategies reflect national growth priorities as a guiding principle aligns well with government's policy of water allocation articulated in the Water Sector Development Strategy (MOWLD, 2007). The WSDS states:

> *"Allocation of water for basic human needs in adequate quantity and acceptable quality will receive highest priority, while other uses will be subject to social and economic criteria. Water for protection of the environment and ecosystems will be reserved."*

The WSDS is also forward looking in that it recognises that water allocation based solely on central criteria is not feasible. The policy acknowledges the importance of strategic allocation among users as well as differences in river basin characteristics (see Figure 31). This recognition is critical for the future development of water resources in Tanzania because each water basin has unique characteristics which must be taken into account in planning. Basin characteristics are provided in some detail in the tables at the end of this chapter. In addition, the WSDS recognises that some basin areas will play a larger role in enabling national growth drivers than others.

Figure 29: Water Allocation Criteria



The WSDS acknowledges the diversity of water users. Nonetheless, as discussed previously, even with wide ranging demand there is substantial under utilisation of water potential overall. Domestic (including industrial) consumption only accounts for a very small proportion of total water usage (2.1%).[69] Given this small percentage, domestic consumption should not be in conflict with other water uses. However, the quality of the domestic water supply is recognised as a potential source of conflict. Tanzania has not yet established water requirements for environment/ecosystem integrity for most of the country's river basins but judging from experience in other countries water quality considerations will be more pertinent. Water for productive purposes, on the other hand, has been at the core of most disputes. This again is not due to a lack of water resources overall but is the consequence of inadequate infrastructure and current ad hoc water management practices, such as uncoordinated sector and user allocations.

69 FAO estimates that irrigation accounts for 97.3% of total water use, followed by domestic and industrial use at 2.1% and livestock at 0.6%.

The alignment of water uses to support both services and productive activities needs to be foundation of each basin- wide strategy. Once these strategies are in place, follow-up action will be required to adjust usage levels and ensure that the water requirements of the selected national growth drivers are met. Investments in infrastructure and services should be promoted that open up new areas of opportunity and give appropriate signals to attract people to new areas (inter-basin and intra-basin) of high water potential that are currently under-utilised. This will not only decongest currently disputed areas but also expand productive activities.

Areas with electricity generating capacity illustrate how opening up new areas and balancing user needs may be accomplished. For example, if electricity generation in the Rufiji River Basin is selected as a growth enabler, most of the potential sites for hydro-development are located in the Iringa region. These include Ruhuji (360 MW), Mpanga (144 MW) and Mnyera (485 MW) (TANESCO, 1995, 1998, 1999; URT, 1981). However, generating power at these sites may necessitate restricting high levels of water[70] use for irrigation and settlements upstream. But since power generation is a non-consumptive use of water these activities could be allowed downstream. Balancing and integrating user needs in the Rufiji Basin could include promoting irrigation along the Kilombero and Rufiji valleys while regulating the scale of irrigation upstream where the water is required for power generation. According to NIMP the Kilombero and Rufiji valleys have substantial irrigation potential and low irrigation coverage (URT, 2002). The potential irrigation area has to be re-examined however, with much of the Kilombero Valley Floodplain (796,735 ha) listed on 25 April, 2002 as a wetland of international importance according to the Ramsar Convention.[71]

This process of identifying alternative and strategic actions and mediating users' requirements underlines the necessity for strong and empowered institutions in terms of finances, legal authority, and administrative and human resource capabilities. Political support of these institutions at both national and local levels is critical because while the national level may promote growth drivers which require water as an enabler, it will be users at the local levels who have to adhere to restrictions on water use. The notion of unlimited abstraction may no longer be possible. The challenge will be for local water authorities to increase understanding among local users of the strategic importance of basin-wide approaches and the national growth agenda in sustaining and improving livelihoods and reducing poverty in Tanzania.

70 Non-consumptive use of water does not degrade water in terms of quality and quantity. Once used water can still be utilised for other purposes. Examples of non-consumptive use are hydropower generation and fisheries.
71 The Ramsar Convention on Wetlands, Ramsar, Iran, 1971. The Convention came into effect in Tanzania on 13 August 2000.

Conclusion

This chapter has outlined the importance of water to the Tanzanian economy, and has challenged the commonly held notion that there is a national water shortage. It makes the case that with improved management and infrastructure Tanzania's abundant water resources could contribute significantly more to the country's development. To achieve this outcome, two important actions are needed. First, public investment decisions in the water sector need to mutually reinforce the national growth agenda. Secondly, basin-wide strategic plans should be developed which improve the coordination of user demands and safeguard water resources now and into the future.

In addition, basin-wide strategies need both high-level and local political support to address the urgent needs for:

- Optimal water resource planning and management, which matches with both the requirements of local users and national growth priorities;
- Infrastructure (in terms of multi-purpose man-made storage facilities) to overcome spatial and temporal shortages of water; and
- Conflict resolution by unlocking un-utilised water catchment areas to draw productive activities away from congested areas with high water demands.

All of these propositions reinforce the National Water Policy and the Water Sector Development Strategy, and are recommended as the way forward in managing Tanzania's water resources in a sustainable way while enabling economic growth.

Table 27: Estimates of Present Water Uses and Water Management Issues for Tanzania's Nine River Basins

Drainage Basin	Catchment Area (sq. km)	Annual Mean Run-off (mm)	Annual Mean Run-off (mm)	Present Water Use					Summary of Water Management Issues
				Consumptive Uses			Non-consumptive Uses		
							Electricity Generation		
				Domestic (million m^3)	Irrigation (million m^3)	Livestock (million m^3)	Installed capacity (MW)	Potential Sites (MW)	
Pangani	56,300	1,001.9	31.5	57.6	1,205.1	14.8	Hale 21 Nyumba ya Mungu 8 New Pangani Falls 68	Mandera 21	• Intra- and inter-sector water allocation conflicts, including reduced flows to New Pangani Falls power plant, and Lower Moshi Irrigation Scheme not fully operational due to inadequate water supply • Drying up of Kirua Swamp • Degradation of Lakes Jipe and Chala • Catchment degradation • Over abstraction at Pangani • Saline intrusion

Drainage Basin	Catchment Area (sq. km)	Annual Mean Run-off (mm)	Annual Mean Run-off (mm)	Present Water Use					Summary of Water Management Issues
				Consumptive Uses			Non-consumptive Uses		
							Electricity Generation		
				Domestic (million m^3)	Irrigation (million m^3)	Livestock (million m^3)	Installed capacity (MW)	Potential Sites (MW)	
Ruvu/Wami	72,930	765.1	51.7	68.5	268.8	6.1			• Water shortages for Dar es Salaam • Catchment degradation • Pollution from industrial discharges and agro-chemicals • Urban sewage pollution • Dropping groundwater tables in Dar es Salaam and saline intrusion
Rufiji	177,420	988.3	185.9	74.8	1,183.9	22.8	Kidatu 204 Kihansi 180 Mtera 80	Ruhudji 360 Masigira 118 Mnyera 485 Mpanga 144 Stigler Gorge 2,100	• Intra- and inter-sector water allocation conflicts, including loss of dry season flows to Usanga wetlands and Ruaha National Park, low levels in Mtera Reservoir due to upstream abstraction and plant level operation, and degradation to Kihansi Gorge ecosystem • Water pollution issues from irrigation and industry • Changes in flow patterns in Rufiji delta • Diffuse source sediment issues from widespread grazing • Potential issues from additional hydropower development

Drainage Basin	Catchment Area (sq. km)	Annual Mean Run-off (mm)	Annual Mean Run-off (mm)	Present Water Use					Summary of Water Management Issues
				Consumptive Uses			Non-consumptive Uses		
							Electricity Generation		
				Domestic (million m^3)	Irrigation (million m^3)	Livestock (million m^3)	Installed capacity (MW)	Potential Sites (MW)	
Ruvuma and Southern Coast	103,720	1,050.0	20.5	36.3	187.9	1.8			• Flooding along Ruvuma River • High sediment loads in rivers during rainy season • Some areas with groundwater deficiency in fluoride and some with high iron content
Lake Nyasa	39,520	1,672.5	344.6	14.1	78.6	3.1		Rumakali 222	• Flooding in lower Songwe River • Unstable border due to meandering Songwe River • Health threats in Kyela from flooding • Large sediment loads entering Lake Nyasa from Songwe River, Livingstone Mountains and Kipengere Range • Pollution from coal mine and artisanal gold mining

Drainage Basin	Catchment Area (sq. km)	Annual Mean Run-off (mm)	Annual Mean Run-off (mm)	Present Water Use					Summary of Water Management Issues
				Consumptive Uses			Non-consumptive Uses		
							Electricity Generation		
				Domestic (million m^3)	Irrigation (million m^3)	Livestock (million m^3)	Installed capacity (MW)	Potential Sites (MW)	
Internal drainage	153,800	619.0	36.6	73.2	876.1	63.3			• Acute water shortages for urban and agriculture • Localised mercury pollution from mining activities • Lack of protection for groundwater recharge areas (some in neighbouring basins) • Catchment degradation • High natural fluoride levels in groundwater in certain areas
Lake Rukwa	88,180	1,095.0	104.5	27.5	319.3	9.6			• Mercury contamination of rivers in north of basin with potential accumulation in closed lake basin • Water access conflict between nomadic pastoralists and farmers in northeast sector of basin • Lake level rising

Drainage Basin	Catchment Area (sq. km)	Annual Mean Run-off (mm)	Annual Mean Run-off (mm)	Present Water Use					Summary of Water Management Issues
				Consumptive Uses			Non-consumptive Uses		
							Electricity Generation		
				Domestic (million m^3)	Irrigation (million m^3)	Livestock (million m^3)	Installed capacity (MW)	Potential Sites (MW)	
Lake Tanganyika	151,900	1,173.6	124.7	77.1	185.4	46.1			• Sediment affecting fish breeding in near-shore lake areas • Reduction in wetlands area, particularly Malagarasi River, from sedimentation • Unlicensed water withdrawal by refugee camps • Local effluent pollution • Agro-chemicals in rivers and groundwater • Potential effects of climate change
Lake Victoria	79,570	1,111.1	18.6	64.1	111.5	39.5			• Water quality degradation from livestock and agricultural practices • Mercury pollution from mining activities. Flow restrictions into National Parks due to upstream abstractions • Drop in lake level from climate effects and excess abstraction in Uganda