

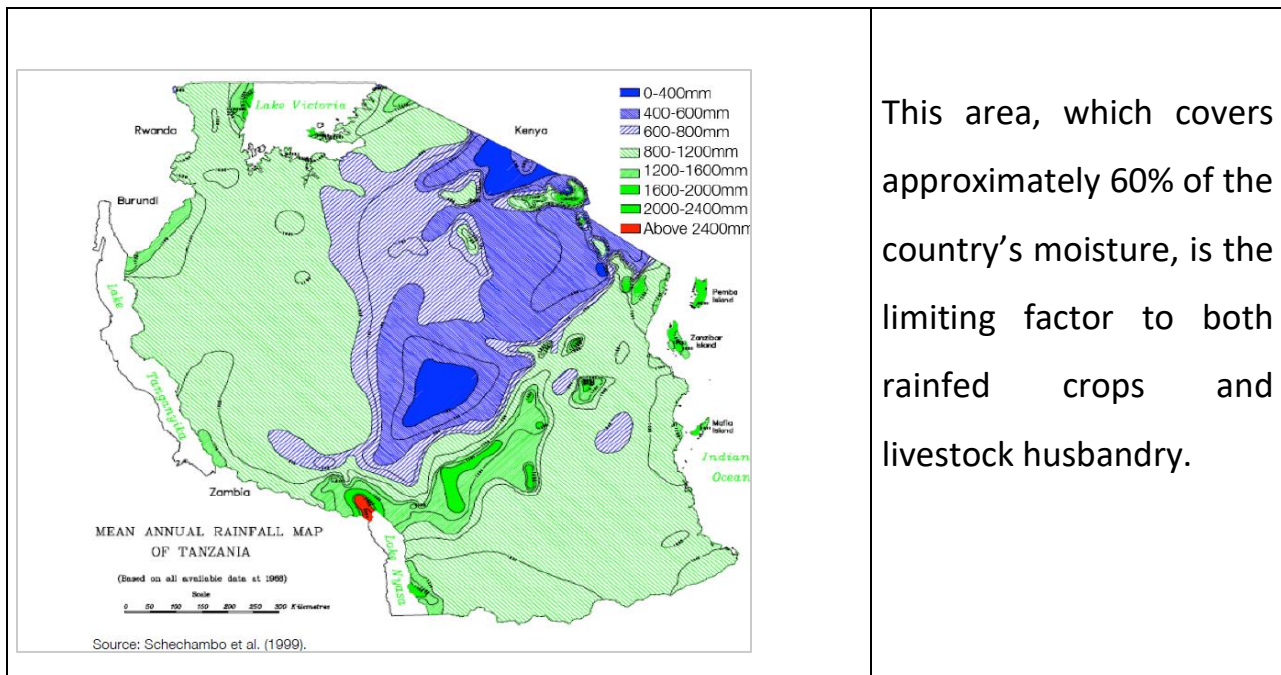
Applications of North-South Slopes in Tanzania

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For background information see: [N-S Slopes in the Sub-Sahara Regions](#)

Semi-arid regions occupy about 60% of Tanzania's land area. Principal areas that constitute the semi-arid areas include the region surrounding the new capital of Dodoma, the Lake Victoria Basin (Sukuma land), and the Maasai territory stretching northwards to the Kenya border (see Figure 1).



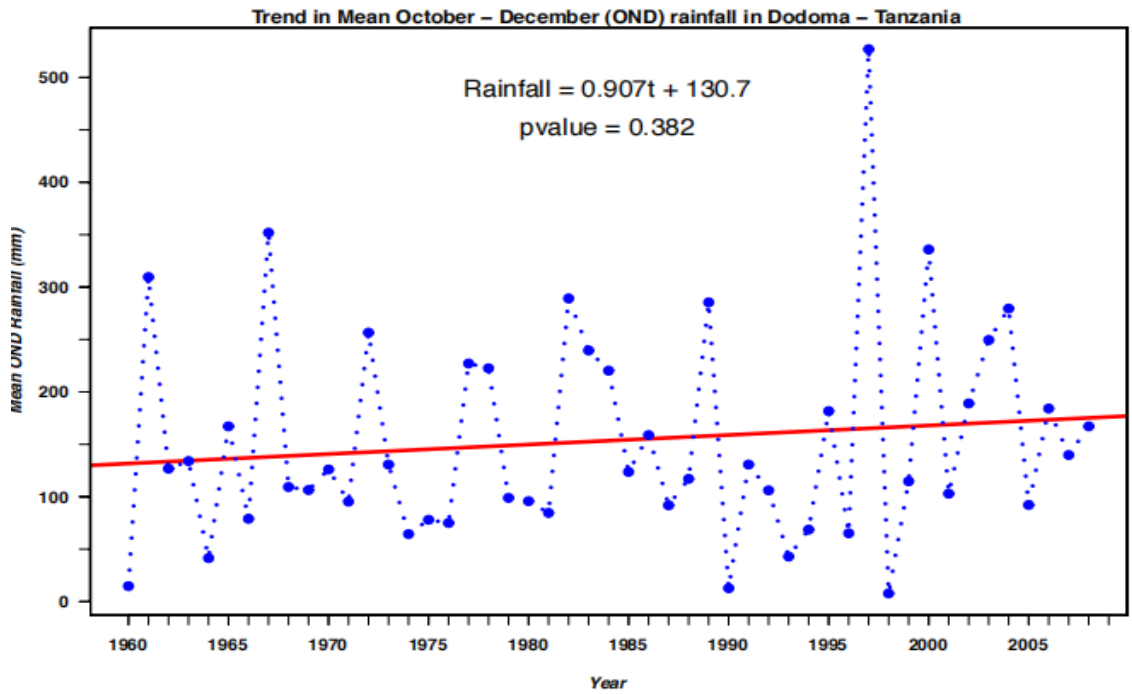
1. Rainfall patterns in Tanzania

The rainfall distribution in Tanzania has been used as a criterion for demarcating the arid, semi-arid, and other zones. The rainfall suffices for the growing period of less than 2 months. In the central semi-arid land, the rainfall onset dates are unreliable. The rainfall is low and covers the crop-growing period of 2 to 3.5 months. The rainfall in the south-eastern semi-arid lands is low, unreliable, but adequate for the 4 to 6 month

growing period. In central Dodoma, the driest region in Tanzania, rainfall is low and highly variable in quantity, duration, and onset and end dates. In these parts of Tanzania, rainfall has been characterized by stronger inter-annual variability rainfall, ranging from 283 mm to 863.7 mm, with a mean of 572 mm. These results indicate a high intra-seasonal and inter-annual variability of rainfall in Dodoma. The figures below depict the slight positive trends for both rainfall and temperature.

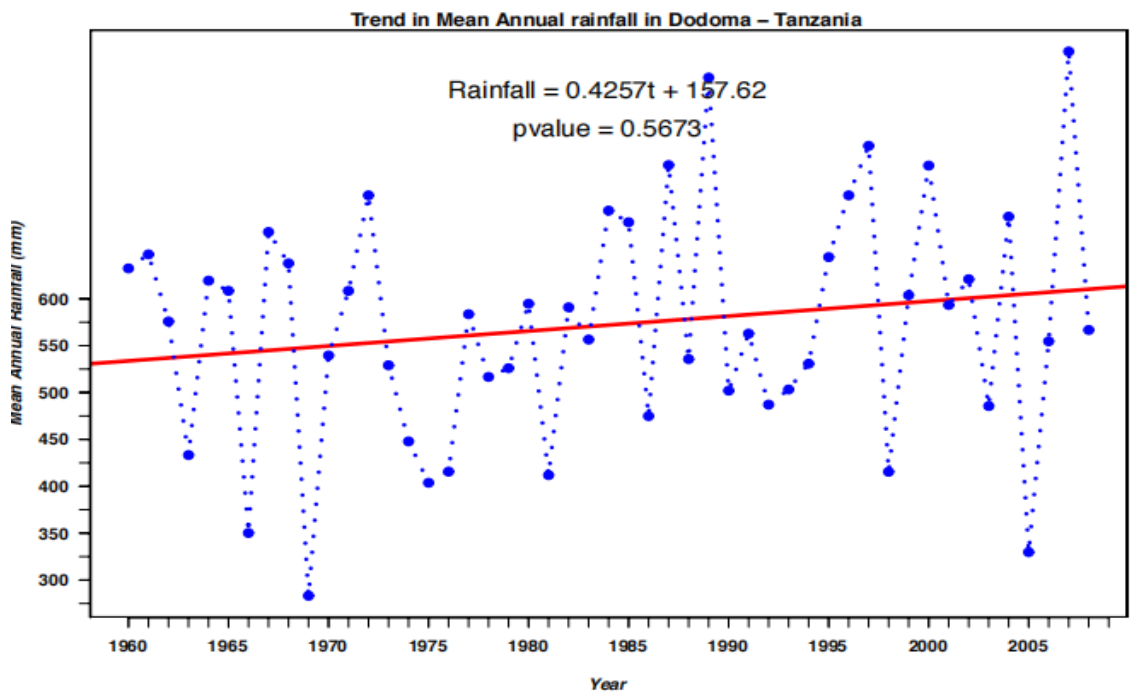
2. Potential crops to be cultivated on the new arable land

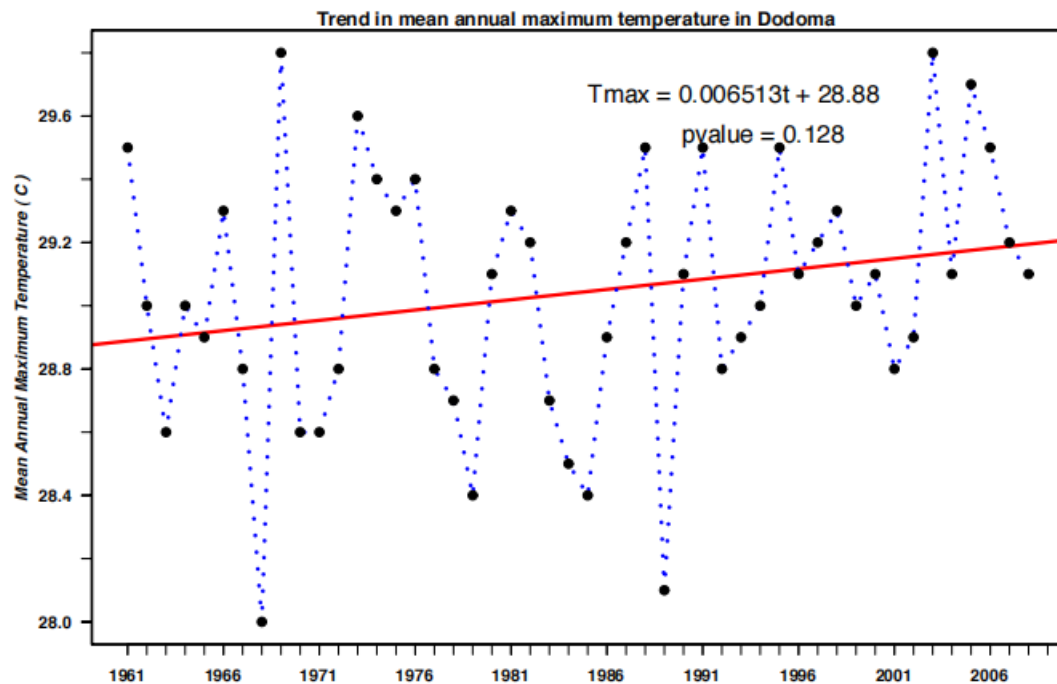
Semi-arid tropical regions are characterized by unpredictable weather, long dry seasons, inconsistent rainfall, and soils that are poor in nutrients. Sorghum, millet, cowpea, chickpea, pigeonpea, groundnut, and—to some extent—maize are the vital crops that feed the poor people living in the Sustainable Agriculture Tanzania regions (SAT). Grapes are one of the economically important fruit crops in semi-arid Tanzania. In the SAT, particularly the Dodoma region, grapes are the most important cash crop. The region is suitable to produce grapes and hence wine. Since its introduction, viticulture cultivation has become fully adapted and contributes significantly to employment and household income (Safari et al., 2015). In view of the significant contributions of grape cultivation to the economic development of both rural and urban households in Dodoma, it is imperative to understand the actors, linkages, activities, product flow, and constraints encountered by actors in the grape cultivation and winemaking value chain. Yields are usually low and highly unpredictable because of the limited amount of soil moisture due to limited rainfall and high evapotranspiration. The north south cultivation concept that decreases evapotranspiration (ET) has the potential to increase the yield and the quality of grape production.



Source: TMA data analysis (2014).

d in mean annual rainfall in Dodoma





3. Environmental impacts, policy, and the economics of cultivating crops to substitute for imports

Semi-arid regions are characterized by high levels of poverty, food insecurity, and malnutrition of both women and children under 5 years old. Land degradation, low as well as unreliable and variable annual rainfall, higher livestock stocking rates, and conflicts among communities related to access and use of crops, grass, and forest land and water resources are prevalent (Hella, 2002). Given the ever-increasing population in these areas, coupled with increasing dégradation of land and other natural resources due to climate change, sound intervention plans and actions must be put in place to mitigate the situation (Hella *et al.* Hella, 2002) and Dixon *et al.*, 1989). This intervention entails establishing stronger institutions for governance and planning, as well as effective social and economic services. The need for conservation and increasing protected areas is reflected in the many policies developed and pieces of legislation

enacted since the late 1990s. These documents include the Forest Policy (1998), the Forest Act (2002), the Environmental Management Act (2004), the Wildlife Policy (2007), and the Wildlife Act (2009).

4. Drivers of economic growth in resilience-building in

Tanzania; Markets and the private sector in the SAT

Tanzania shares similar constraints to other SATs. Most parts of SATs are water-scarce, and rural areas have weak transport linkages to attract investments in the production of diverse farm products. The state has been promoting private sector development in recent years, with some success in the food-processing and textile industries. There are also plans to develop the extractive industries and improve the productivity of agriculture. However, much of the population remains engaged in subsistence agriculture, with limited ability to engage with formal markets. The lifestyle and economic strategy of people living on the SAT are traditionally characterized by their need to ensure an adequate water supply and protection against food shortages. The facts that these areas are regarded as unsuitable for cultivation and that rainfall patterns are unpredictable and subject to great fluctuations means people are not attracted to live in them. Therefore, human populations and investments in terms of communication, transportation, and industry are not put in place. These areas could benefit from the construction and cultivation on the north-south slopes. Tanzania is ready to collaborate with different stakeholders to develop a pilot and build capacities and enable marginalized communities in its SAT to break away from poverty, as stipulated in the government's Vision 2030.

It is important to note that communities in these areas have lived within these constraints for centuries. They have existed on the productivity provided locally and

have used their knowledge to devise adaptive strategies to build their resilience. When the situation becomes unbearable, they have used migration, both seasonal and permanent, as a survival strategy. However, how the dynamics of climatic conditions affect agro-pastoral communities and the resulting policy implications of human and livestock migration in the SAT remain unclear.

5. Human development and responses to climate risks in the SAT

Human development is not only a matter of expanding people's choices to be educated, to live longer and healthy lives, and to enjoy a decent standard of living. Development also means ensuring that these choices are secure and sustainable. Most of the communities in the SAT are insecure because of the harsh conditions that they live in. Access to education is weak, and high illiteracy rates are a long-standing obstacle to economic development. The overall literacy rate in Monduli district, for example, is 65%, with noticeable differences across gender, poverty status, and area of residence (Economic Development Initiatives, 2005). It is therefore important to enable communities in the SAT to withstand the shocks that emanate from the changing climate by increasing their resilience through education. Strong evidence shows that countries that possess and cultivate human capital outperform countries lacking human capital.

6. How will the newly arable land be distributed to local farmers?

All land in Tanzania is public and remains vested in the President as trustee for and on behalf of all citizens of Tanzania. Public land falls into three categories: i) general land; ii) village land (e.g., land occupied by Tanzanians of African descent under customary law;

and iii) individual ownership, which can be by a single person or joint tenants. The Village Land Act provides the legal framework for village land. Under the Village Land Act, land is classified as: Communal land, Occupied land, or Vacant land. Village Land is managed by a Village Council elected by a Village Assembly.

In this respect, we can get land to demonstrate the North-South Slope concept since the Village Land Act gives village governments the responsibility and authority to manage land, including issuing Certificates of Customary Right of Occupancy within their boundaries and establishing and administering local registers of land rights.

6. Public perception

International environmental groups may criticize the program. We want, however, for these decisions to be made by policy makers in Tanzania and not by international groups. We need to stress that while the newly arable land in Africa may have environmental impacts, more food would otherwise be cultivated in other countries for export to Africa. This situation would also create environmental consequences in these countries. All agriculture on existing or newly arable land has unavoidable environmental consequences.

The project can be tested in the Dodoma region, where land is vast, and aridity limits the productivity and general livelihood of the people. During the pilot stage, we can access the village government with authority over the land, and local people can learn by seeing the benefits of land development. The developed land can be owned communally; at a later stage, farmers can opt to develop land individually.

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