

Tanzania's coffee landscape: The climate and market dynamics

By Pilly Silvano, Daniel Mwalutolo, Ng'winamila Kasongi, Christine Noe and Nestory Yamungu

Department of Geography, P.O Box 35051, University of Dar es Salaam

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Abstract

This paper provides an overview of Tanzania's coffee landscape in terms of policy, practices, and dynamics in marketing, climatic conditions, and small farmers' responses to all these changes over the years. Based on the review of literature, the paper maps the key actors and their interests in sustaining the coffee industry. In addition, the paper draws some comparative aspects from across the research sites of the Paradoxes of Climate-Smart Coffee (PACSMAC) project in Tanzania to facilitate further analysis of how different actors react to market and climate changes thereby influencing policy and practices of small farmers.

Keywords: Coffee, value chain, climate change, actor-interventions, smallholder farmers, Tanzania

1.0 Introduction

This paper draws from an ongoing collaborative research project on The Paradoxes of Climate-Smart Coffee (PACSMAC). The project collaboration is between Copenhagen Business School (Denmark), University of Dar es Salaam (Tanzania), Jimma University (Ethiopia), Lafayette College (USA) and ESADE (Spain). The research team is highly multidisciplinary involving political scientists, geographers, anthropologists and agricultural economists with different interests in study transformations in agricultural practices, business strategies, and stakeholder relationships in Ethiopia and Tanzania's coffee value chains (VCs). With expertise in both country's coffee VCs, the PACSMAC team is well positioned to analyze sectoral changes and model possible future scenarios informed by archival, ethnographic, focus group, interview, survey, and geospatial data.

The project is set to make both empirical and theoretical advances. Empirically, it is envisaged that the project will go beyond the existing knowledge that addresses only agronomic strategies to support production (Jaramillo et al. 2011, Läderach et al. 2017, Pham et al. 2019), sustainability governance and upgrading in coffee global value chains (GVCs) that only covers certification systems and relationship in coffee business models (Bray & Nielson, 2017, Vicol et al. 2018). Little attention is paid to how climate change, in addition to consumer preferences, (re)shapes the sector. Moving beyond this knowledge base, PACSMAC will analyze how climate change adaptation and mitigation innovations may (re)shape governance and upgrading along the whole coffee VC in order to understand how impacts on and strategies of coffee farmers and downstream firms interact.

Theoretically, PACSMAC takes on Neilson's (2019) recommendation that future work on GVCs and Global Production Networks (GPNs) in agricultural supply chains, such as smallholder coffee production in the Global South, should pay greater attention to developing and applying the concept of "livelihood upgrading". Yet, there has been no consistent theoretical integration between the GVC/GPN and the sustainable livelihoods literature when evaluating 'value chains for development' interventions (Neilson 2019). PACSMAC project fills this research gap by further developing the concept of 'livelihood upgrading' in the context of climate-change risks and evaluating how synergies and trade-offs may arise between VC upgrading and livelihood improvement. Thus, the project is guided by three main questions; 1) How might climate change itself, alongside the mitigation and adaptation efforts intended to address it, affect the governance of coffee VCs originating in Ethiopia and Tanzania? 2) How do these changes affect the distribution of value along the chain, upgrading opportunities and farmer livelihoods? 3) How might these changes reshape the geography of coffee production and forest cover?

This working paper intends to shed light on the coffee sector landscape in Tanzania. It does so by analyzing the trends - climate and market changes, production and interests of coffee VC actors - which are all linked to address the research questions.

1.1 General coffee sector development in Tanzania

Tanzania's Development Vision envisages that by the year 2025 the country will have been transformed from a low productivity agricultural economy to a semi-industrial one. Notably, the National Agricultural Sector Development Program (ASDP) (2017/2018 – 2022/2023) supports the required transformations in the agricultural sector towards higher productivity, commercialization and improved smallholder farmer livelihoods (United Republic of Tanzania (URT, 2001). The envisaged transformations are to increase farm-level productive investments, expanding access to inputs and improving business environments.

Agriculture remains one of the main economic sectors in Tanzania. Since 2012, its contribution to the National Gross Domestic Product (GDP) has remained above 25 percent. In 2020, the share increased to 26.9 percent and 30 percent in 2021 (TCB, 2021). Nearly eight million households in Tanzania were involved in agricultural activities in the agricultural year 2019/2020, which represented 65.3 percent of the total number of Tanzanian households. The majority (65 percent) were engaged in crop farming while the rest were active in both cropping and livestock keeping.

Tanzania is the fourth-largest coffee producer in Africa after Ethiopia, Uganda, and Cote D'Ivoire. The ASDP describes coffee as one of the strategic cash crops hence highlighting the need to transform the coffee industry by improving productivity and promoting Tanzanian coffee on export markets in order to improve price premiums as well as exploiting new market opportunities (URT, 2001). Also, the strategy envisages building a competitive and sustainable coffee sector by optimizing the internal marketing system and improving the overall business environment.

It is estimated that 90% of coffee is produced by smallholder farmers and only 10% by the estates. Both Arabica and Robusta coffee varieties are grown in an estimated total area of 265,000 hectares. In terms of distribution, as Figure 1 indicates, Arabica is extensively grown while Robusta is confined in the north-west of the country mainly in the Kagera region (Ruben et al, 2018). According to the estimates by the Tanzania Coffee Board (TCB), the proportion of contribution to the total production between Arabica and Robusta coffee stands at 51.8% and 44.2% respectively (TCB, 2022). On average, the Tanzanian coffee sector has been generating about 100 \$ million per annum over the past 15 years, which represents 5% of the total exports.

The sector supports the livelihoods of over 450,000 smallholder farming households whose average coffee plot size is between 0.5- and 1.0-hectares in the northern zone and 2-3 in the southern zone

(TCB, 2017). Of these, 120,000 farmers are in the Robusta growing areas of Kagera Region. An additional estimated 2.4 million people are indirectly engaged in the industry locally (TCB, 2017; Kangile et al, 2021).

1.2 The Policy Context

Like many other agricultural sub-sectors in Tanzania, coffee has experienced major regulatory reforms. These reforms relate to Coffee Industry Act (1977) and Revised (1987 and 2001), Coffee Marketing Board Act (1984), Crop Board Act (1993), Tanzania Coffee Board (2001), Coffee Industry Regulation (2012) and its Supplement (No.13 of 2013) and Coffee Industry Development Strategy (CIDS) (2011-2021; 2021-2025). Before 1990's the government's coffee sector policy centered on increasing coffee production by nationalizing private estates, controlling coffee prices, and expanding its macro-economic policy (Brooks and Kessy, 2017). During that time, all coffee marketing, processing, exporting, and extension services were under the state-controlled cooperatives, the Coffee Authorities and/or Tanzania Coffee Marketing Board and all the processing activities were financed by government banks (Baffes, 2004, Ponte, 2004; Brooks and Kessy, 2017).

The Tanzania Coffee Industry Act of 1977 and Coffee Marketing Board Act (1984) restricted coffee exportation by private traders. For example, Section 7(1) of the Coffee Market Board Act (1984) stipulates that, 'no person other than the Board, a person or body of persons designated on that behalf by the Board shall export any coffee or coffee products' (URT, 1984: 3). In the late 1970's and 1980's the government experienced economic hardships and fiscal deficits that required major reforms to restore macroeconomic balance and efficiency to the economy (Mkandya, 2010). During this period, coffee production declined significantly hence constraining the state's ability to continue subsidizing the coffee sector (Chachage, 2003).

Major reforms in the coffee sector happened from 1990's when Tanzania began a simultaneous process of market liberalization and privatization under President Ali Hassan Mwinyi. Among other things, the reforms led to the adoption of the 1993 Crop Board Act which marked a profound change in the regulatory framework of Tanzania coffee marketing (Brooks and Kessy, 2017). It reduced the state's regulatory role and its ability to control coffee price and marketing (URT, 1993; 2001). Also, the Crop Board Act authorized licensed private coffee traders to buy and sell their coffee through multiple marketing channels as well as processing in their own factories (Ponte, 2004; Brooks and Kessy, 2017). The Act also authorized any person or group of persons who purchased a trading license to claim ownership of coffee, including raw coffee (URT, 1993). All these led to the liberalization of coffee marketing in the 1994's (Ponte, 2004). Moreover, the government formulated the Tanzania Coffee Industry Act (URT, 2001), which re-established Tanzania Coffee Board (TCB) while formulating the

Tanzania Coffee Research Institute (TaCRI), Tanzania Coffee Development Fund (2012), and Tanzania Coffee Stakeholders Forum. The Act gave TCB substantial administrative and regulatory mandates on all matters pertaining to coffee production and marketing such as coffee quality control, regulations, auctioning and issuance of license to coffee dealers.

As part of the country's Agricultural Sector Development Strategy (ASDS), the government (through TCB in collaboration with coffee industry stakeholders in the country) launched the Coffee Industry Development Strategies (CIDS) (2011-2021 and 2021-2025) to address constraints facing the industry. The core objectives of these strategies were to increase national coffee production and quality so as to improve incomes for the entire value chain, particularly for coffee farmers (TCB, 2011; 2021). In particular, one of the key targets of CIDS (2011-2021) was to double the coffee production from 50,000 metric tons (MT) in 2011 to 100,000 MT in 2021. However, this target has not been fully achieved.

The mid-term evaluation reports of the CIDS (2011-2021) have indicated that the CIDS missed its target for 41 percent (TCB, 2017). As a result, in 2021 TCB reviewed the 2011-2021 CIDS and developed the New Coffee Development Strategy (NCDS) (2021-2025) to address shortcomings of the old CIDS. The NCDS aims to increase coffee production from 68,147 MT in 2021 to 300,000MT in 2025, increasing in quality from 39.4% to 70% of the total production, improve the position of Tanzania in the international coffee market, increase domestic consumption of coffee from 7% to 10% and percentage of value-added coffee by 15% (TCB, 2021). Despite these reforms in coffee sector, coffee production is still facing enormous challenges such as volatile coffee price; climate change; lack of access to agricultural inputs and extension services and coffee diseases.

2.0 Coffee Production, Exports and Prices

The Coffee Board has recently in 2023 published the countrywide coffee production data for 23 seasons from 2000/2001 to 2022/2023. The data shows that total production has been generally fluctuating while the two types of coffee depicting different positive trends. As Figure 1.1 indicates, on the one hand, Arabica's positive trend has been stagnant for the entire period of analysis. This stagnant trend is associated with significant decline in coffee production in the northern zone which has been the leading producer for years following coffee price dropdowns, high production cost, land shortage as well as climate change threats associated with increasing droughts, pests and diseases (URT, 2012; Pham et al, 2019 and Wagner et al, 2021). On the other hand, Robusta has a significant increasing trend, which is associated with it being less susceptible to climate condition compared to Arabica (Bunn et al, 2015).

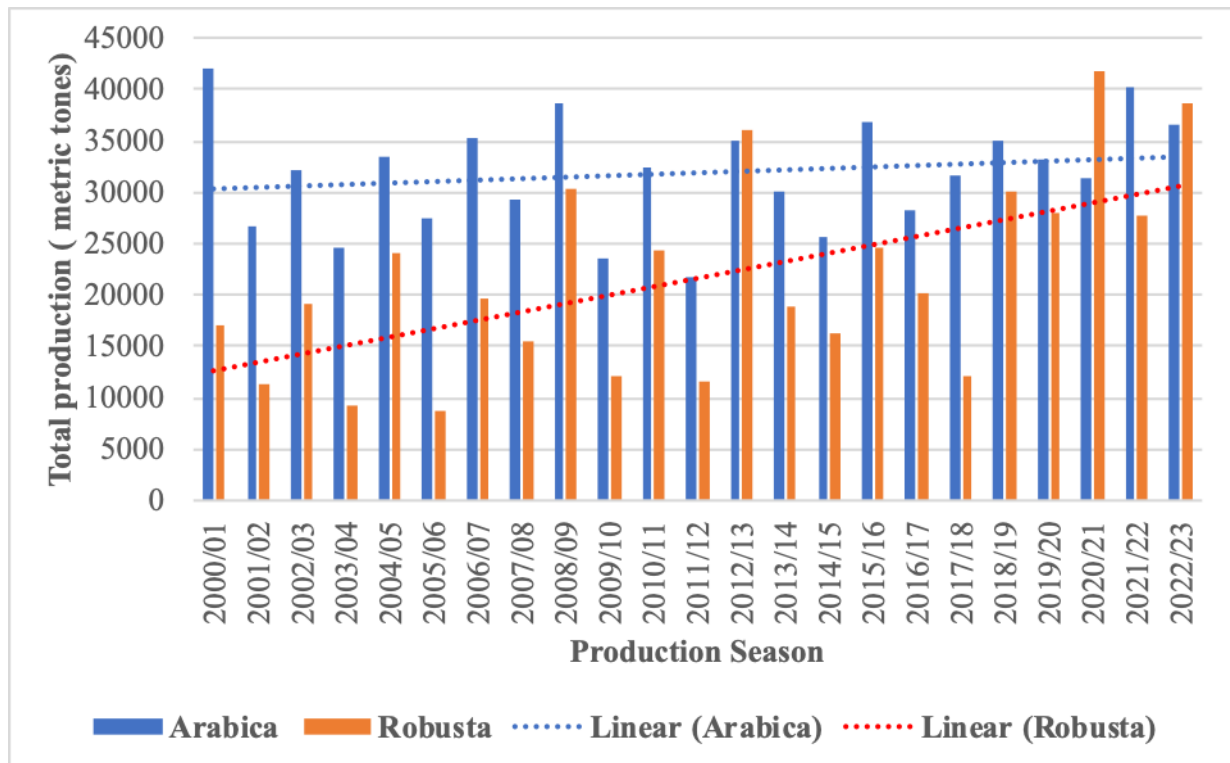


Figure 1.1. Coffee production trends in Tanzania

Source of Data: TCB (2023)

Currently, Arabica coffee production is booming in the southern regions. This trend is associated with the relative better coffee prices in the past three to four years which have influenced farmers to care for their coffee trees. Unlike in the north where land is limited, farmers are opening new farms. Figure 1.2 presented below suggests, there is a big proportion of coffee volume that comes from Kagera region (mainly in Kyerwa district) and Ruvuma (mainly in Mbinga district). Mbozi district in Songwe region (which spitted from Mbeya) remains the dominant producer. It is also observed that coffee is increasingly grown in other regions such as Mara (specifically Tarime district), Kigoma, Tanga, and others.

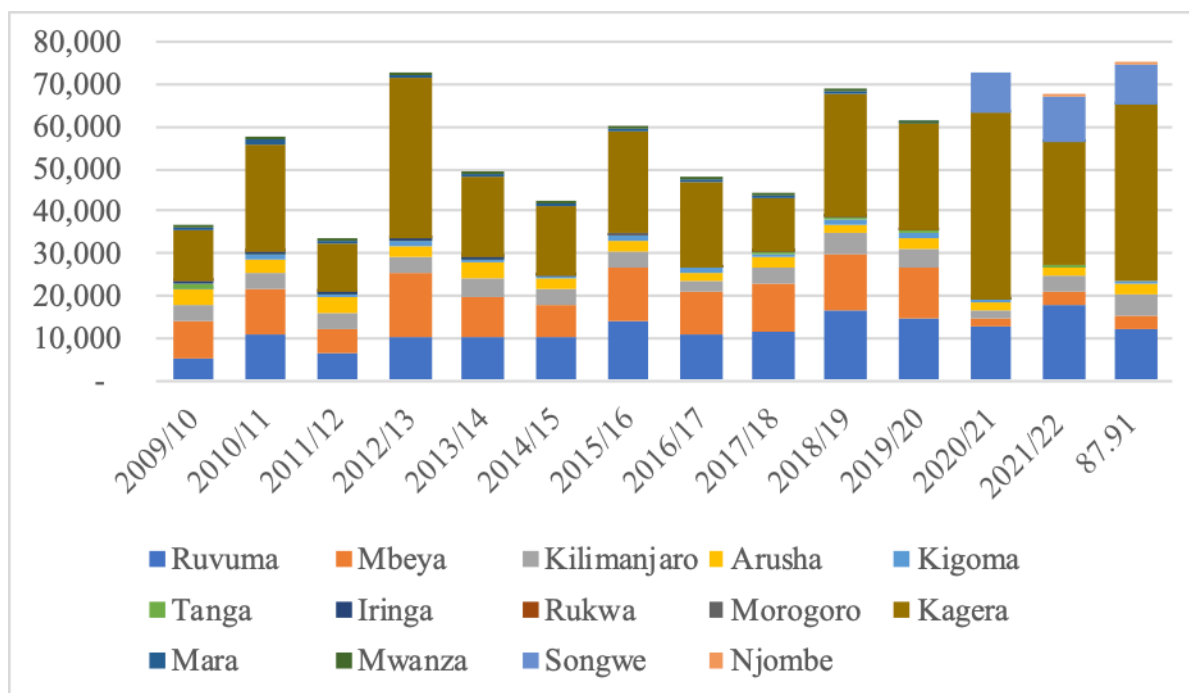


Figure 1.2. Coffee production by region (2009/2010-2022/2023)

Source of Data: TCB (2023)

Over 90 percent of coffee produced in Tanzania is exported to Europe and Asia. Local coffee consumption is generally low compared to tea. Until year 2000, coffee was exported only after auction (Ponte, 2002). Since then, Tanzania started to get slowly into direct export (DE) channels. Currently, however, DE has become the main channel with the past three years indicating that over 70 percent of coffee was channeled through this option (Figure 1.3).

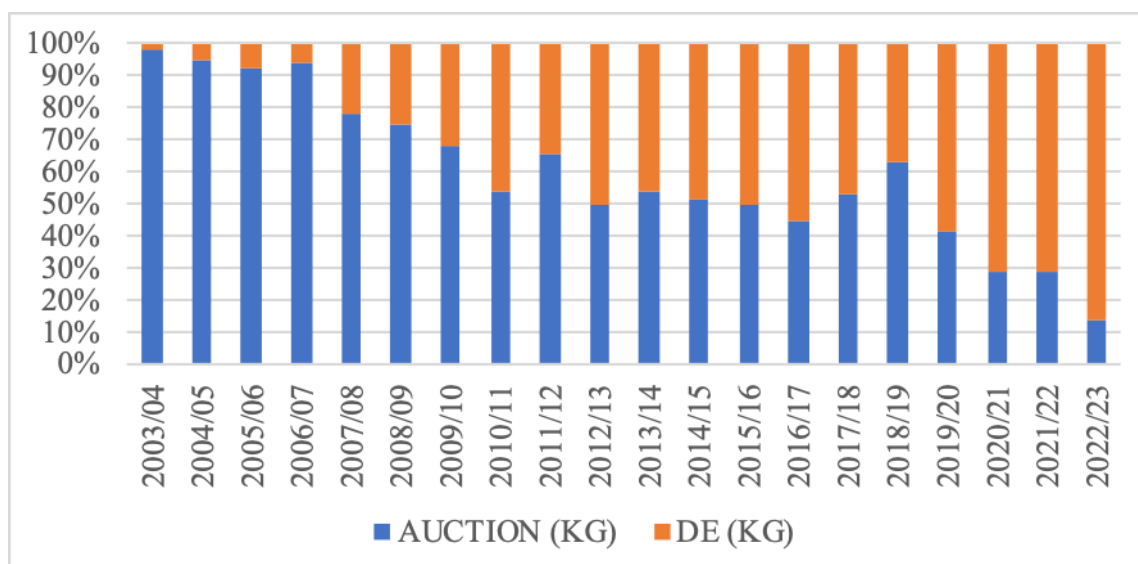


Figure 1.3. Coffee export proportions in Tanzania (2003/2004-2022/2023)

Source of Data: TCB (2023)

For some time, coffee farmers have experienced significantly low and fluctuating prices since early 1990 when the world entered into the liberal market economy (Ponte, 2002, Grabs & Ponte, 2019). Low coffee prices have contributed to reduced productions , for instance, farmers in the northern zone shifted to alternative crops to sustain their livelihoods. In particular, bananas, carrots, tomatoes and potatoes have fetched higher market prices than coffee especially because these crops allow two harvest seasons per year (Howland et al, 2021). Apart from unsatisfactory coffee prices, low productivity is also caused by the fact that farmers have reduced investment in inputs while also maintaining their old coffee trees (URT, 2012). Despite the declining trends indicated in Figures 1.4 (a) and 1.4 (b), there has been better prices in the past four years in both auction and direct export channels.

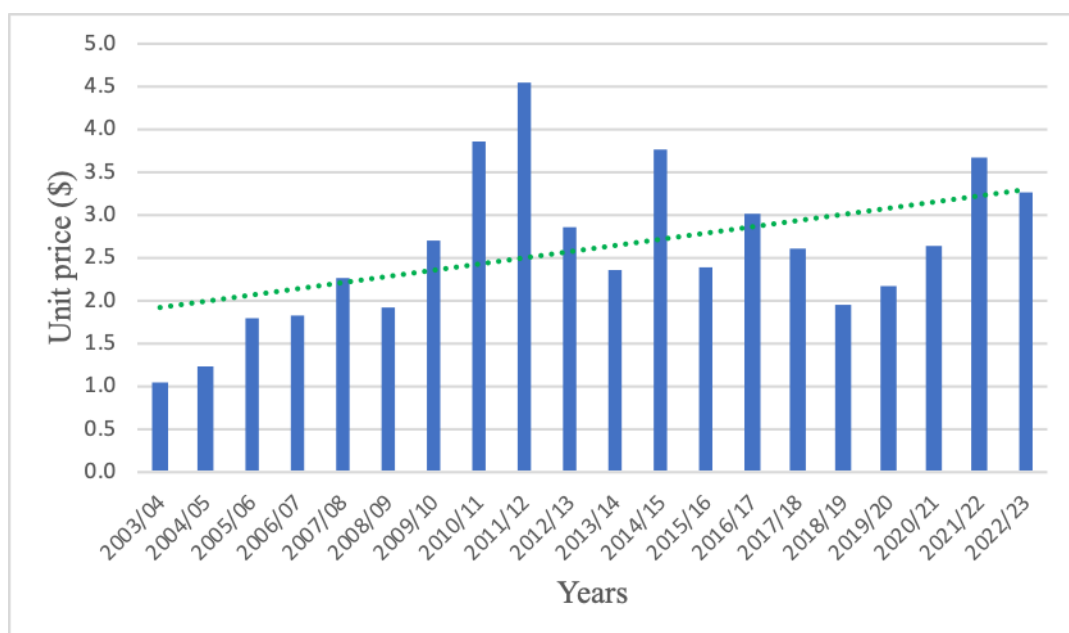


Figure 1.4. (a) Auction price/kg

Source of Data: TCB (2022)

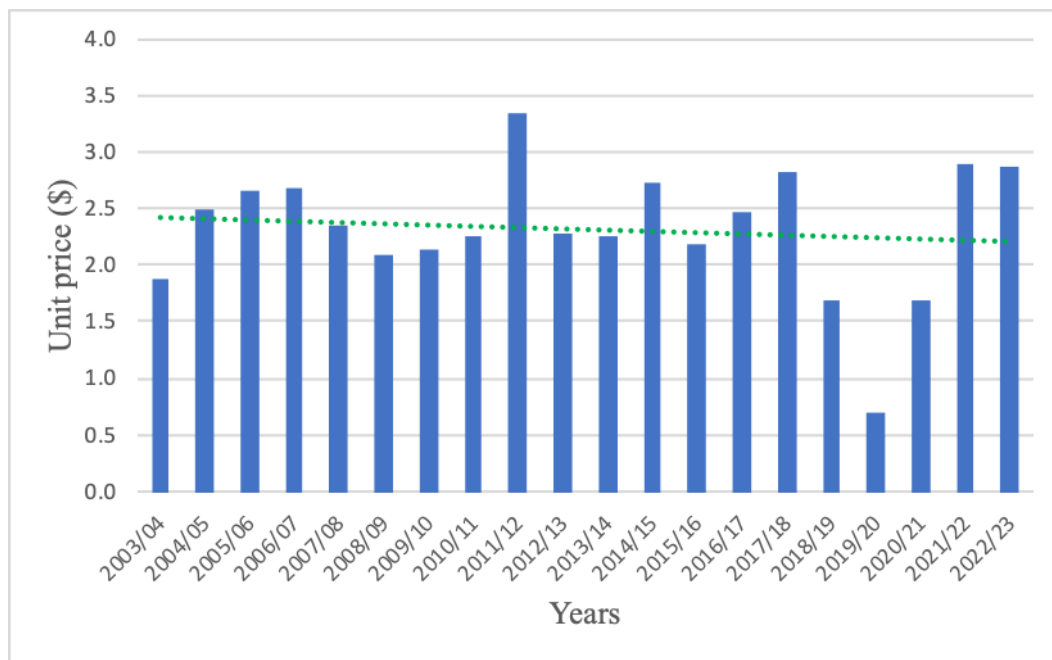


Figure 1.4. (b) Direct Export price/kg

Source of Data: TCB (2022)

Figure 1.5 shows the long-term coffee export in Tanzania for 1990/1991-2019/2020 season. The data makes a flat trend-line and a year-to-year fluctuations in coffee exports. The highest coffee exports were observed in 2011/2012 and the lowest in 2018/2019. Generally, coffee export fluctuations are associated directly with prices (Sambuo et al., 2017).

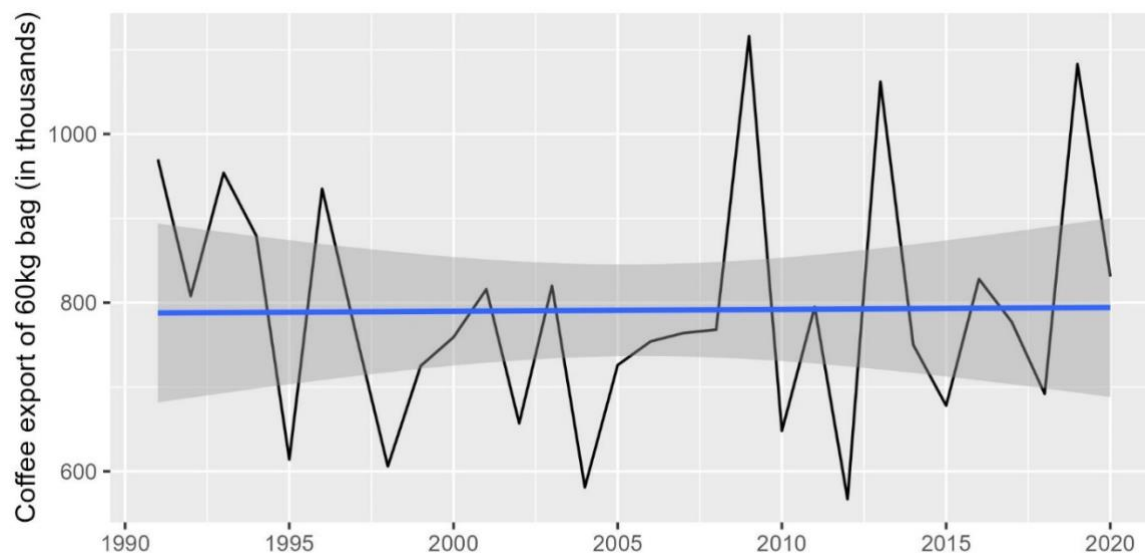


Figure 1.5. Tanzania's coffee export volume

Source of data: International Coffee Organization (ICO), (2022)

2.1 Coffee value chain configurations in Tanzania

As in most other countries in Africa, coffee introduced Tanzania to the global market as early as 1910s and 1920s. This explains the fact that the sector attracts the attention of many national and international actors who are involved in production, processing, marketing, regulations and most recently, in different climate change adaptation initiatives. Table 1. summarizes the key actors and their interests in Tanzania's coffee industry. These actors are categorized according to their role and position in the coffee value chain. The categories are namely; regulators, producers, processors, exporters, and those responsible for marketing, financing and storage.

Suffice to say that the government of Tanzania is prominently present in the coffee sector as a regulator with interests to increase production and percentage contribution to the national foreign income. Precisely, the Ministry of Agriculture provides legal and policy guidance; formulate rules and regulations related to coffee production and marketing. The Tanzania coffee board (TCB) plays an important advisory role to the government on policies and strategies for the development of the industry, issuing various licenses and permits; collecting and disseminating statistics as well as running coffee auctions. Other important government agencies are such as Tanzania Coffee Research Institute (TaCRI) that work to produce, maintain and/or increase coffee resilience to various changes including climate.

Table 1: Summary of key actors in Tanzania's coffee industry

Key action	Name of actor(s)	Roles /Interests
VALUE CHAIN FUNCTIONS		
Production	Smallholder farmers, and estates	Produce coffee, utilize coffee research and innovation products
Processing		
<i>Primary processing</i>	Smallholder farmers and estates	Coffee processing by hand pulping or central pulping units (CPUs)
	AMCOS	Manage Central Pulping Units (CPUs).
<i>Secondary processing</i>	e.g. City coffee, MCCO, GDM, DAE	Coffee curing.
	BUKOP	Hulling the coffee.
	TANICA, AMIMZA	Roasting coffee
Trading and Exporting	AMCOS	Selling coffee through auctions and/or direct sales on behalf of farmers.
	Estates	Selling their coffee through Auctions or direct exports
	Buyers/Exporters e.g. Taylor Winch and Dorman	Buying/exporting coffee.
SUPPORT FUNCTIONS		
Regulation	Ministry of Agriculture	Supervises the sector through legal and policy guidance.

	Tanzania Coffee Board (TCB)	Regulate the coffee industry and advises the government on all issues pertaining to coffee production, processing, and marketing.
	Tanzania Cooperatives Development Commission	Oversees and regulates the cooperative unions, and provides policy guidance and operational framework that is geared towards restructuring cooperatives.
Research	Tanzania Coffee Research Institute (TaCRI)	Coffee Research and innovation, increase production and crops' resilience.
NGOs (Projects)	HRNS, Vi-agroforestry, Café Africa,	To boost coffee productivity, build climate resilience, fostering market access for coffee farmers.
Financing	e.g. Tanzania Agricultural Development Bank (TADB), BRAC Maendeleo.	Financing the coffee industry.
Inputs (fertilizers)	Government of Tanzania, Banks	Offering inputs at subsidized prices, and loans.
Associations	Tanzania Coffee Association (TCA)	Lobbying and upholding the interests of large-scale coffee farmers and traders.

Source: Authors

TaCRI works with farmers to share knowledge and provide technical advice on best practices. Secondary coffee processors include curing companies like Mbinga/Mbozi Coffee Curing Company (MCCO), Coffee Management Services (CMS), Mr Grivas D. Mwangoka (GDM), City Coffee and Dan & Associates Enterprises (DAE) company. Others are Hullers (BUKOP Limited) and roasters (Tanganyika Instant Coffee Public Limited Company (TANICA PLC), Amir Hamza (T) Limited, DAE, and GDM). In the past, roasters (mainly TANICA) bought coffee through cooperative unions (i.e. KCU and KDCU). However, following recent changes in regulation, intermediaries including the Unions have been excluded in buying coffee. Currently, all country-based roasters are required to buy coffee through auctions, which has increased competition and benefited coffee farmers. Most recent statistics show that 70% of coffee is channeled through direct export while the remaining 30% goes through auctions (TCB, 2022).

Smallholder farmers and estates are important actors in the production node. These maintain interest as key producers who put into use coffee-related research and innovations relating to both production and marketing. As discussed earlier, Tanzania's coffee sector is dominated by smallholder farmers by almost 90% (Kangile et al. 2021), followed by the medium to larger estates (some of which are found in the PACSMAC project sites including Aviv estate in Mbinga and Kanji Lalji in Mbozi district). These estates have been producing significant amounts of coffee. At the production level, there are also Non-Governmental Organizations whose roles have been on sensitization and supporting initiatives for climate-smart coffee practices. This is mainly to ensure sustainable production and supply while also supporting farmers to comply with global standards for enhanced market returns. Some of the

NGOs that are found in the project area include Hanns R. Neumann Stiftung (HRNS), Solidaridad, Vi-Agroforestry, AGRI-connect, and Café Africa.

2.2 Value chain mapping

This section maps the value chain for Arabica and Robusta coffee. The value chain outlines the relationship between actors and actions in the industry. However, the coffee value chain for Arabica and Robusta differs as described in the following sub-sections.

2.2.1 Arabica coffee value chain

Farmers who produce Arabica deliver their coffee in terms of red cherries or parchments to primary cooperative societies (AMCOS). The collected red cherries are processed through CPUs at the AMCOS. Unlike smallholder coffee producers, large scale coffee producers (estates) process their coffee in their own CPUs (Figure 1.6). Afterwards, coffee from estates and AMCOS are taken to the warehouses and curing plants which may be publicly or privately owned, followed by curing, grading, and cupping before entering the auctions. In the meantime, AMCOS and estates may enter into an agreement with buyer for direct sales but that has to happen through TCB. Currently, direct sale is the main market channel. Under the current practices, local roasters use their own coffee or buy through auctions.

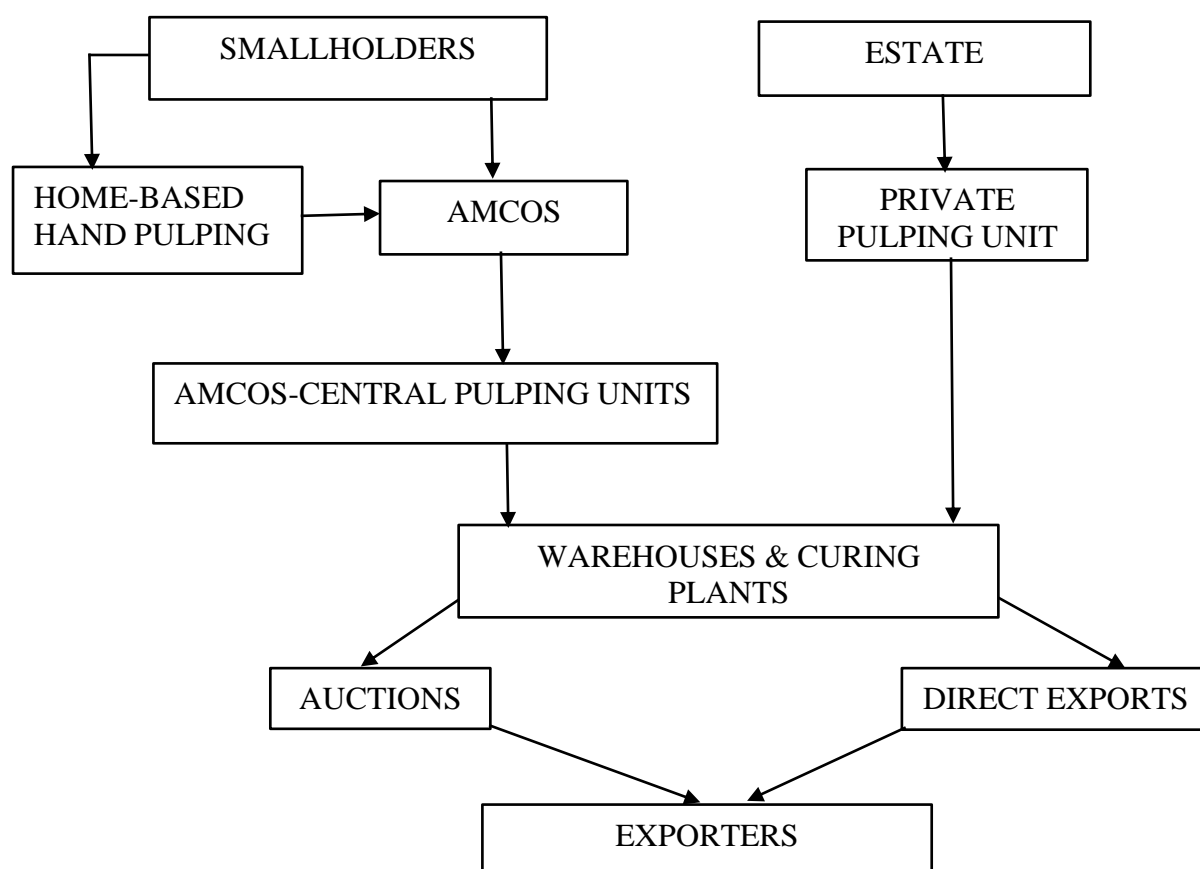


Figure 1.6. Arabica coffee market chain Structure in Tanzania

Source: Authors

2.2.2 Robusta coffee value chain

Robusta coffee channeling is almost the same as that of arabica only that the former takes dried cherries to the AMCOS. AMCOS collects and inform TCB zonal office on the volume that is ready for auctioning or direct sale. For direct sales to happen, the buyer(s) enter into a contract with AMCOS through TCB. Similarly, medium to large-scale farmers take their coffee to either auctions or make direct sales. Accordingly, auctions for robusta are done for dried cherries. When auctions have been done or an agreement for direct sale reached, hulling and export follows (Figure 1.7).

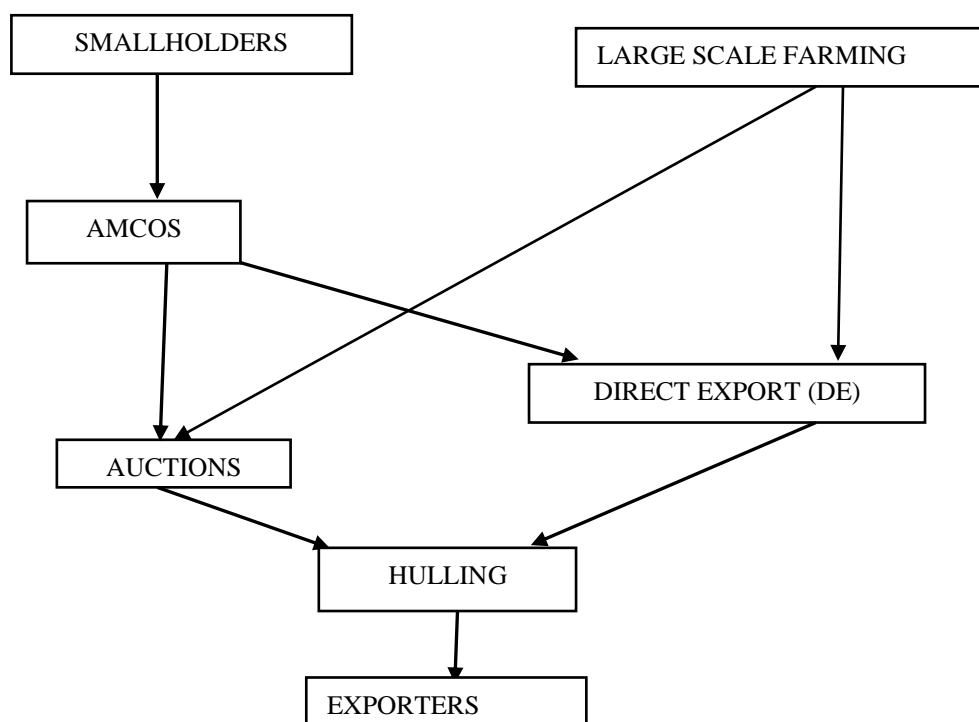


Figure 1.7. Robusta coffee market chain structure of Tanzania

Source: Authors

2.3 Market dynamics and local practices

Tanzania's coffee market is foreign-oriented as over 90 percent of coffee is exported while less than seven is consumed locally (TCB, 2021). From the 1960's to the mid-1990's coffee marketing and exportation were completely controlled by the state organizations such as coffee cooperatives and marketing boards. Farmers delivered coffee to primary cooperatives and received their payments in installments based on the government mandated price. Coffee at the cooperatives were milled, graded, and then delivered to the marketing board for purchase at the auctions by private exporters. Private exporters were only allowed to purchase coffee through Tanzania Coffee Board (TCB) auction conducted in Moshi. Under the state control marketing system the state succeeded to stabilize coffee prices, ensure farmers' access to market and subsidized agricultural inputs through cooperative unions (Ponte, 2004). However, the payment system under state control was considered ineffective

(see Temu 1999; Ponte 2004). There were some delays in coffee payments after delivery to cooperative unions.

Major reforms in coffee marketing in Tanzania happened in 1990's. The government ability to control coffee marketing and price was reduced. The reforms allowed the market forces to determine the coffee price rather than the government. Private buyers were allowed to purchase coffee directly from growers and process it in their own factories in competition with government supported coffee cooperative unions. However, the government preserved the power over the process by requiring private buyers to apply for a specific license that would allow them to purchase coffee in auction. Also, TCB was empowered by the Coffee Industry Act of 200 to auction all coffee produced in Tanzania. Liberalization of coffee marketing allowed coffee farmers to have a choice to sell their coffee to private buyers, cooperative societies, farmers groups or independent primary societies. This brought competition and prices picked up. Moreover, the access to private traders in domestic coffee market implied the end of monopoly system dominated by coffee cooperatives (Kessy, 2020). Also, engagement of private buyers in coffee marketing enabled coffee farmers to receive cash payment on delivery. However, coffee market liberalization has increased costs of agricultural inputs as cooperatives cut-down the provision of credits for agricultural inputs to farmers, which in turn lowered coffee production (Ponte, 2004). Ponte also showed that liberalization of Tanzania coffee market led to foreign companies dominating coffee market. This brought tensions between stakeholders.

Since the introduction of market liberalization policies, the government has made various efforts to improve coffee marketing environment. For instance, in 2013 the government adopted the Coffee Industry Act that required all coffee buyers to be registered and acquire license from TCB to buy coffee from either registered coffee growers or auctions. Similarly, the Cooperative Societies Act of 2013 required coffee farmers to join AMCOS as a market channel. This allowed cooperative unions (such as KCU) to get coffee from farmers through AMCOS. The unions would either export coffee directly or sell to exporters through an auction which was conducted in Moshi. Such a practice gave market monopoly to cooperative societies, which affected coffee prices. Over time, farmers complained about low prices and higher investments. Especially in Kilimanjaro and Meru, low prices coupled with other factors such as land scarcity caused farmers to abandon coffee farms due to unprofitability. In 2018, the government introduced new directives that have changed the coffee marketing arrangement. The government banned the purchase of cherry or parchment by the private coffee buyers at the farm gate level and issued an order that coffee should only be channeled through AMCOS, which delivers to auction. Government also required coffee auctions to be held in places where coffee are grown in three zones, namely Moshi Zone that comprises Kilimanjaro, Arusha, Tanga and Manyara Region; Kagera zone composed of Kigoma, Geita, Kagera and Mara regions, and Songwe

zone composed of Rukwa, Iringa, Mbeya, Ruvuma and Katavi regions. Each growing zone selects specific places to sell its coffees. The exportation of unprocessed coffee was also banned to add value to the local produce and allow farmers to fetch higher prices in the foreign market. Direct sale from farmers to exporters was prohibited although farmers are still allowed to export their coffee directly through AMCOS. Each village can only have one AMCOS but this does not limit farmers from selling coffee to AMCOS outside the village boundaries. During preliminary fieldwork in the southern and north-west Tanzania, it was found that price differences between the AMCOS was a major factor determining where farmers would take their coffee. This has made farmers to constantly search for AMCOS that pays better prices for their coffee. Table 2 indicates the number of functional AMCOS in both arabica and robusta producing regions. The southern regions (Ruvuma and Songwe) have more functional arabica AMCOS than the northern (Kilimanjaro and Arusha), which tells also that farmers in the north have replaced coffee while those in the south have expanded production.

Table 2: Cooperative societies and AMCOS membership

Name	Region	Coffee type	Registered AMCOS
Kagera Cooperative Union (KCU)	Kagera	Robusta	135
Karagwe District Cooperative Union (KDCU)	Kagera	Robusta	89
Kilimanjaro Native Cooperative Union (KNCU) Ltd	Kilimanjaro	Arabica	90
Arusha Cooperative Union	Arusha	Arabica	42
Mbinga Farmers' Cooperative Union Ltd (MBIFACU)	Ruvuma	Arabica	114
Songwe Region Cooperative Union (SORECU)	Songwe	Arabica	67

Source: Preliminary fieldwork, 2022

Table 2 suggests also that each AMCOS is registered under a cooperative union as required by the Cooperative Societies Act (2013). The same Act requires farmers to have membership of AMCOS. However, not all smallholder farmers have AMCOS membership. Also, despite the coffee regulations such as Coffee Industry Act of 2013 that prohibit unlicensed people to trade coffee at any level some farmers are still engaged in informal business practices with brokers especially in the times of financial hardship. In such practices, farmers borrow money and promise to repay by giving their coffee yields.

Such informal agreements are made while coffee is still on farm. These practices are common in all coffee growing regions and have local names such as *Butura* (in Kagera) and *Mtoano* (in Mbinga) and *Ezyansanga* (in Mbozi). Also, because of low coffee prices and delays in coffee payments some coffee farmers in border regions especially Kyerwa District in Bukoba are involved in illegal cross-border business where coffee is smuggled mostly to Uganda.

In January 2021, the government (through a public announcement by the Prime Minister while in Kagera) coffee auctions was to be made more transparent to ensure farmers gain more benefits starting from 2021/2022 season. The auctions are open to buyers registered with TCB who meet all statutory requirements. To address farmers' concerns, the Prime Minister provided some directives to TCB and coffee cooperative unions (such KDCU, KNCU) to address some existing challenges in coffee marketing. These directives include;

- Cooperatives unions should not buy coffee directly from AMCOS but instead establish subsidiary companies that will compete with other buyers in auctions.
- TCB to ensure that buyers pay for coffee after auction and payments be transferred to AMCOS in 24 hours.
- AMCOS to pay their farmers within 24 hours after receiving the payment from buyers.

Although not all directives have been achieved so far, we confirmed during the fieldwork that farmers are happy with the government decision and reported that the payment is now done at shorter time compared to the past years.

3.0 Tanzania policy response to climate change

Dealing with climate change has become a necessity to many countries to avoid the disruption of national socio-economic progress. Like other developing countries, Tanzania has taken several measures to respond to climate change effects. The National Climate Change Strategies (NCCS) (2012-2018) and (2021-2026) testifies the desire to enhance the capacity of the country to address the adverse impacts of climate change and to pursue low emissions pathways to achieve sustainable development (URT, 2021). Accordingly, NCCS provides for adaptation, mitigation and cross cutting interventions that focuses on enabling the country to address the negative impacts of climate change. Also, there are several national development frameworks, plans and strategies that aim to address the impacts of climate change including Tanzania Sustainable Energy for all (2015), National Five Year Development Plans (FYDP) 2015/16-2020/21; 2020/21-2026/27, National Climate Change Communication Strategy (2013), National Environmental Action Plan (NEAP) of 2013 and 2020 as well as National Guidelines for Mainstreaming Gender into Climate Change Adaptation related Policies, Plans, Strategies, programmes and Budgets (2014). Moreover, the government has established several

legal frameworks that are relevant in combating the effects of climate change. These legal frameworks include the Environmental Management Act No.20 of 2004 and Disaster management Act (2015).

At the regional level, Tanzania is part of the East African Community (EAC) and Southern African Development Community (SADC) which have taken several regional efforts to address climate change challenges. The government has signed and is implementing various instruments developed under these regional communities including the EAC Climate Change Master Plan (2011-2031), Resolutions on the establishment of EAC Climate Change Fund and Lake Victoria Basin (LVB) (2021-2026) as well as Climate Change Adaptation Strategy and Action Plan, (2018). The government of Tanzania is also signatory to SADC Protocol on environmental management for sustainable Development which calls for harmonized strategies to address and respond to the impact of climate change (2015) (URT, 2021).

At the international level, the country reaffirmed its commitment by signing and adopting several international agreements including the United Nations Agenda 2030 for Sustainable Development Goals (SDG), with climate change as its 13th goal. Tanzania is also a signatory of United Nation Framework Conventions on Climate Change (UNFCCC) and Kyoto Protocol. The country produced a National Adaptation Programme of Action (NAPA) in 2007 to meet the requirements of UNFCCC.

These policies, strategies and plans further provide directives, guidelines and steps towards addressing adaptation and mitigation priorities in the coffee sector. Various adaptation and mitigation strategies have been promoted and implemented to address the impact of climate change on production in coffee growing regions. These include application of technologies in pest and disease management, conservation of soil and water sources, improved access to climate information for coffee producers. Also, various research, knowledge and capacity building strategies on climate change and its impacts have been promoted. Other strategies include adoption of sustainable crop production and farming systems cognizant of climate change scenarios such as the use of new crop varieties that are resistant to pests, diseases and drought as well promotion of agroforestry systems, mulching and intercropping.

3.1 Climate change and its impact on Tanzania coffee industry

Recent studies have established that coffee yields are especially affected by elevated night temperatures (Craparo et al., 2015) and droughts due to a shift in seasons (Wagner et al., 2021). In Tanzania, studies have demonstrated a significant reduction in coffee production due to a decline in long rains. Mbwapbo et al., (2021) assessed the impact of current climate change on Tanzania's Arabica coffee production using climatic database of 40 years (1970-2018). The study found that the minimum temperature has been increasing at a higher rate than the maximum temperature in the Northern and Southern Highlands zones. The increase in temperatures and precipitation shortages

has negative impacts on coffee flowering and fruiting. Specifically, for the northern zone, the short rains in October have continuously delayed triggering flowering in coffee plants after the dry spell period (Mbwambo et al., 2021; Jassogne et al., 2013). Likewise, long rains in March to May are delayed and, in most cases, inadequate hence affecting the expansion stage, during which rainfall is required to sustain berry development (Mbwambo et al., 2021). In the southern zone, there are no significant decrease in rainfall during the growing season (November to May) and annually. Moreover, the Southern Highlands zone is also characterized by very insignificant changes in temperature in June, July, and August.

As argued by Jaramillo et al., (2011), the severity of pests and disease spread is likely to increase with advancing climate change. As such, TaCRI, (2011) establishes that climate change is a significant challenge in coffee production for the commercial varieties which are high susceptibility to major coffee diseases like Coffee Berry Disease (CBD) and Coffee Leaf Rust (CLR). Due to this, Tanzania Coffee Research Institute (TaCRI) has developed coffee hybrid varieties (SC 3, SC 11, SC 14 and KP 423) that are resistant to CLR and CBD, better beverage quality and high yield (TACRI, 2011).

3.3.1 Rainfall Trends and Variability

In the four study sites for the PACSMAC project, annual rainfall trends are decreasing except in Kyerwa district where rains seem to be increasing consecutively for the past four decades (Figure 1.8). Specifically, total annual rainfall trend in Kyerwa shows statistically significant ($p < 0.05$) increasing monotonic trend with the annual increase of 282 mm year⁻¹ from 1981 to 2021.

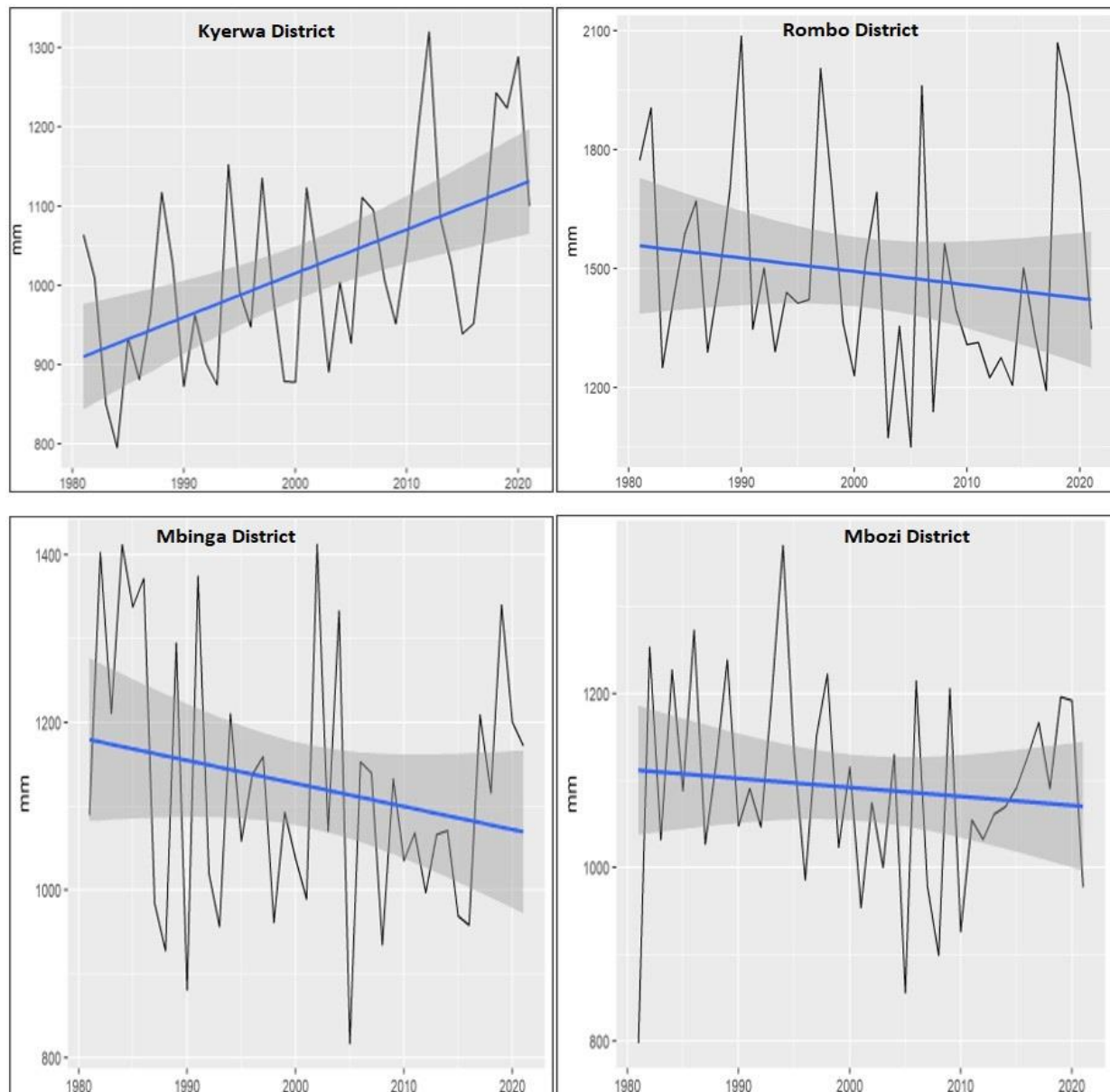


Figure 1.8. Annual rainfall trends in the project sites

Source: Authors' own calculation based on Climate Hazards Group InfraRed Precipitation with Station (CHIRPS) 2021 data.

Despite the observed trend, when the data is split into decades, the distribution of total annual rainfall indicates that the median annual rainfall has been increasing from 951.7 mm in decade one to 1131.2 mm in decade four. Likewise, the variance of total annual rainfall is bigger in decade one and four than decade two and three (Figure. 1.9). This suggests that decade one and four had experienced more annual rainfall variability than decade two and three. Furthermore, rainfall distribution has inter-annual variability. The variability was observed to be within the range of 6% and 13%. The range of rainfall coefficient of variability indicate small degree of inter-annual rainfall variability.

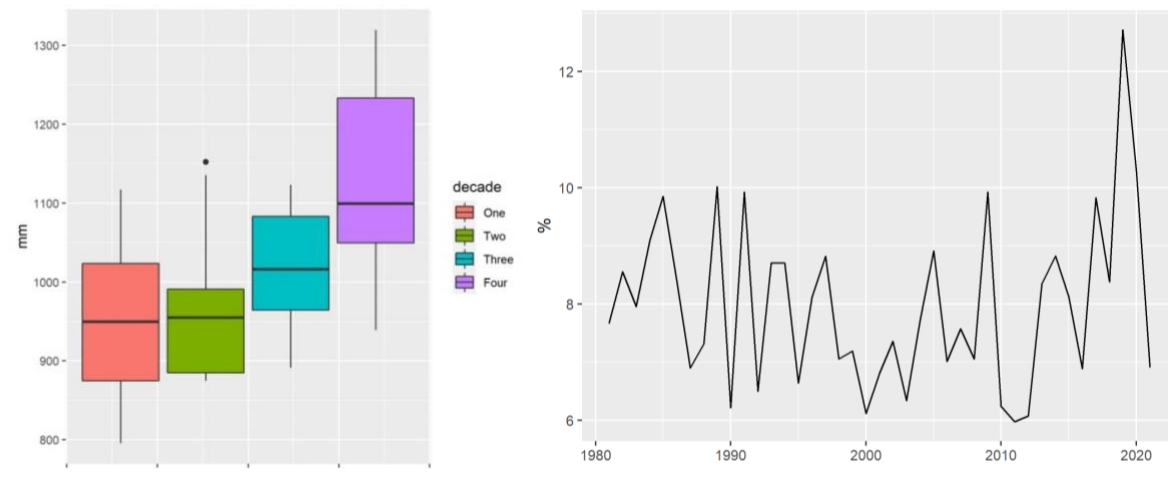


Figure 1.9. Decadal distribution and inter-annual rainfall variability in Kyerwa district (1981-2021)

Source: Authors' own calculation based on CHIRPS 2021 data

Note: One: 1981-1990, two: 1991 - 2000, three: 2001 -2010, four: 2011 - 2021

In Rombo district, the total annual rainfall trend shows non-statistically significant decreasing monotonic trend ($p > 0.05$) with the annual decrease of 126 mm year^{-1} from 1981 to 2021. However, when the data is split into decades, the distribution of total annual rainfall indicates that the median annual rainfall has been decreased from 1616.6 mm in decade one to 1466.2 mm decade four. Likewise, the variance of total annual rainfall was observed to be bigger in decade one and four than decade two and three. This suggests that decade one and four had experienced more annual rainfall variability than decade two and three. As Figure. 1.10 indicates rainfall distribution has inter-annual variability within the range of 25% and 40%. The range of rainfall variability indicates high degree of inter-annual rainfall variability.

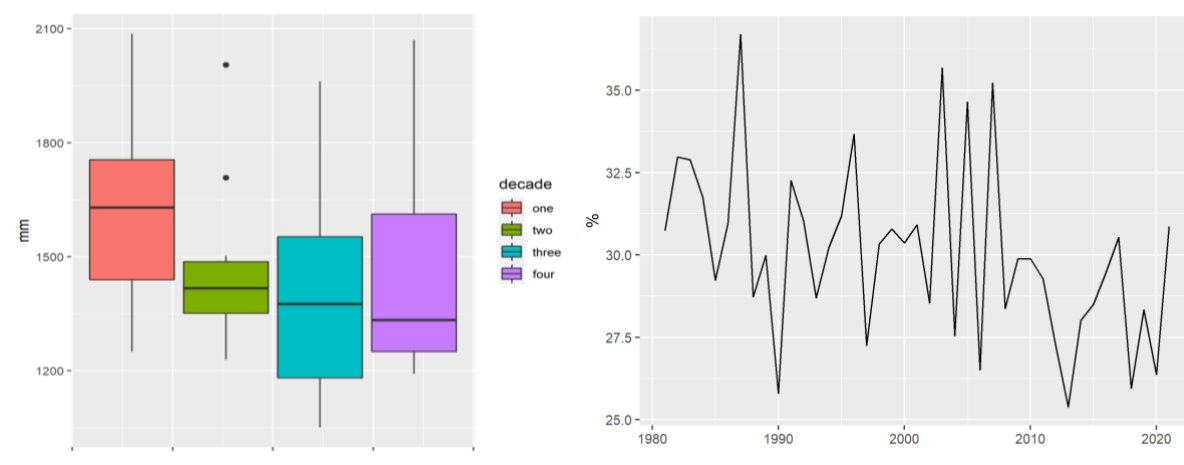


Figure 1.10. Decadal distribution and inter-annual rainfall variability in Rombo district (1981 to 2021)

Source: Authors' own calculation based on CHIRPS 2021 Data

Note: One: 1981-1990, two: 1991 - 2000, three: 2001 -2010, four: 2011 - 2021

In Mbinga district, the total annual rainfall trend shows the statistically significant ($p > 0.05$) decreasing monotonic trend with the annual decrease of 80mm year⁻¹ from 1981 to 2021. When the data is split into decades, the distribution of total annual rainfall indicates that the median annual rainfall has decreased from 1191.3 mm in decade one to 1106.2 mm in decade four. The variance of total annual rainfall was observed to be bigger in decade one and four than decade two and three. This suggests that decade one and four had experienced more annual rainfall variability than decade two and three. As Figure. 1.11 indicates further, rainfall distribution has inter-annual variability within the range of 4% and 15%. The range of rainfall variability indicates a small degree of inter-annual rainfall variability.

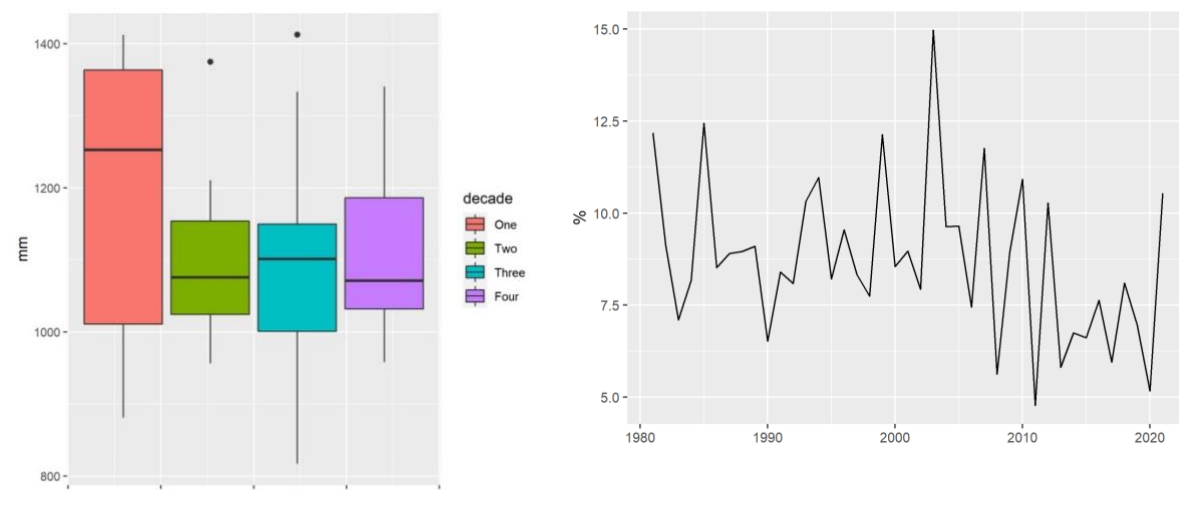


Figure 1.11. Decadal distribution and inter-annual rainfall variability in Mbinga district (1981 to 2021)

Source: Authors' own calculation based on CHIRPS 2021 Data

Note: One: 1981-1990, two: 1991 - 2000, three: 2001 -2010, four: 2011 - 2021

In Mbozi district, the total annual rainfall trend indicates a non-statistically significant ($p > 0.05$) decreasing monotonic trend with the annual decrease of 63 mm year⁻¹ from 1981 to 2021. In the four decades, the distribution of total annual rainfall indicates that the median annual rainfall has decreased from 1210 mm in decade one to 1080 mm in decade four. Indeed, the variance of total annual rainfall was observed to be bigger in decade one and four than decade two and three. This suggests that decade one and four had experienced more annual rainfall variability than decade two and three. Also, as Figure 1.12 indicates, rainfall distribution has inter-annual variability within the range of 6% and 13%. The range of coefficients of variation indicates small degree of inter-annual rainfall variability.

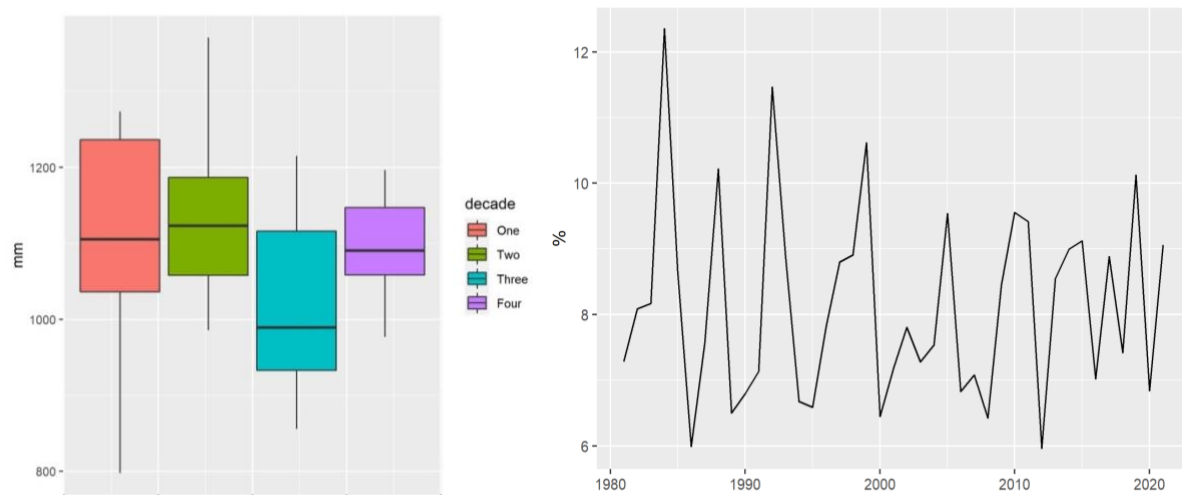


Figure 1.12. Decadal distribution and inter-annual rainfall variability in Mbozi district (1981 to 2021)

Source: Authors' own calculation based on CHIRPS 2021 Data

Note: One: 1981-1990, two: 1991 - 2000, three: 2001 -2010, four: 2011 - 2021

Overall, rainfall trends suggest that only the Robusta site in Kyerwa district had increased rainfall, and all the Arabica sites had decreasing rainfall trends. The inter-annual rainfall variable suggest that Kyerwa had lowest variability than all other sites. Thus, rainfall patterns are still generally good in the Robusta site than Arabica sites.

3.3.2 Temperature Trends and Variability

Figure 1.13 indicates that annual average temperature has been increasing from 1983 to 2016 in all four PACSMAC sites. The results of non-parametric monotonic trend indicate that inter-annual temperature trends were statistically significant ($p < 0.05$) in all four sites. Despite having small annual average temperature, Rombo district has also had significant increase of annual average temperature from 1983 to 2016. The annual average temperature in Rombo district had an annual increase of $0.021^{\circ}\text{C}/\text{year}$, followed by Mbinga district with the annual increase of $0.017^{\circ}\text{C}/\text{year}$. Mbozi and Kyerwa had the lowest annual temperature increase of $0.011^{\circ}\text{C}/\text{year}$. The increase of temperature tends to alter the optimal coffee growing conditions, and it can lead to yield decline (Khat et al., 2020). Also, increase of temperature triggers the occurrence of coffee pests and diseases such as coffee wilt disease (Jawo et al., 2020).

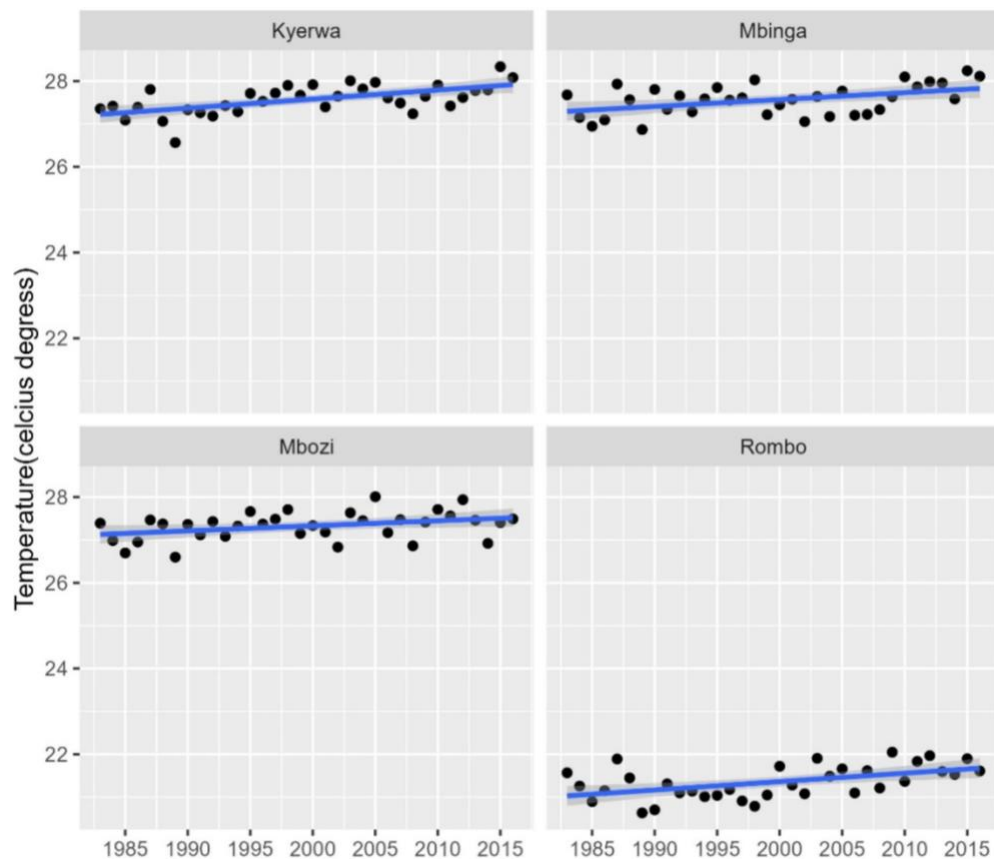


Figure 1.13. Inter-annual temperature trend from 1983 to 2016

Source of data: Authors' own calculations based on CHIRPS 2022 data

3.3.3 Impacts of Climate Change on Coffee Production

Globally, studies have reported the impacts of climate change on coffee production. However, majority of these studies have reported the impacts on Arabica coffee production (Pham et al., 2018). Similarly, in Tanzania, majority of studies that reported impact of the climate change on coffee production are largely focused on Arabica coffee producing sites (Northern and the southern Tanzania). Thus, there are limited studies on the impacts of climate change on Robusta coffee. The main impacts reported in these studies include, decline of rainfall, increase of temperature, phenological shift, increase of pests and diseases (Wagner, et al., 2021; Mbwambo, et al., 2021; Craparo et al., 2015,2021). Table 3 summarizes these studies.

Further, some global and regional ecological studies have also projected the impacts of climate change on geographical distribution of coffee (Bunn et al., 2015; Davis et al., 2012), which suggest that Tanzania like other coffee producing regions, is likely to lose large suitable areas of coffee production, particularly Arabica due to progression of the impact of climate change (such as increase of temperature and decline of rainfall). But the findings of these studies are limited to country level analysis, and little is known to the district and village levels.

Overall, studies suggest that climate change has adversely affected coffee production in the country. It is likely that the TCB's vision to increase coffee production from 50,000 to 300,000 tones might not be easily realized due to the impacts of climate change. Thus, adoption of climate adaptation and mitigation measures are needed at the farm level to preserve coffee production.

Table 3: Impacts of climate change on coffee production in major production areas

Impacts of climate change	Study location	Source/Authors
Decline of rainfall	Kilimanjaro & southern highlands	Mbwambo <i>et al.</i> , 2021; Wagner <i>et al.</i> , 2021
Increase of temperature (such as night-time temperature)	Kilimanjaro, Arusha & southern highlands	Craparo <i>et al.</i> , 2015,2020; Mbwambo <i>et al.</i> , 2021; Wagner <i>et al.</i> , 2021
Yield decline	Arusha	Craparo <i>et al.</i> , 2015
Increased Coffee pests and diseases	Kilimanjaro, Southern Highlands	Mbwambo <i>et al.</i> , 2021; Wagner <i>et al.</i> , 2021; Otieno et al., 2019
drought	Kigoma	Msuya, 2013
Phenological shift	Kilimanjaro	Wagner <i>et al.</i> , 2021; Crapora <i>et al.</i> , 2015,2020
Excessive rainfall	Kilimanjaro	Wagner <i>et al.</i> , 2021
Disappearing of Arabica suitable areas and shift to highlands	Tanzania Arabica growing zones	Lemma & Megersa, 2021. Bunn et al., 2015, Davis et al., 2012
Unpredicted rain seasons	Kilimanjaro	Temba et al., 2020
Shift in geographical distribution of coffee	Tanzania	Bunn et al., 2015; Davis et al., 2012

4.0 Interventions on coffee value chain and climate change in Tanzania

Tanzania has implemented several coffee-related interventions. Some are completed while others are still ongoing. The earlier project working paper (Grabs et al., 2022), search tools were used with inclusion and exclusion criteria which identified 16 interventions relevant to the case of Tanzania. Together with the results of our preliminary fieldwork in 2022, about six more interventions were identified making the total of 22 coffee-related interventions in Tanzania. Table 4 summarizes these interventions in terms of their focus, timeframe and specific geographical locations.

As Figure 1.14 indicates, the focus of most of the existing interventions relates to climate change mitigation and impact adaptation. These initiatives are aligned strongly with the growing literature that acknowledges the significant threat of climate change to the coffee sector through irregular rainfall patterns, the prevalence of dry conditions, and the increase in pests and diseases (Wagner et

al., 2021, Craparo et al., 2015). Notably, the interventions target coffee farmers to apply climate-smart practices, diversification, and certify their coffee with the aim to increase coffee production with better prices for livelihoods. Some of the interventions (see for example P01 and P06), provide financial support, training of the farmers and extension officers as well as creating market linkages.

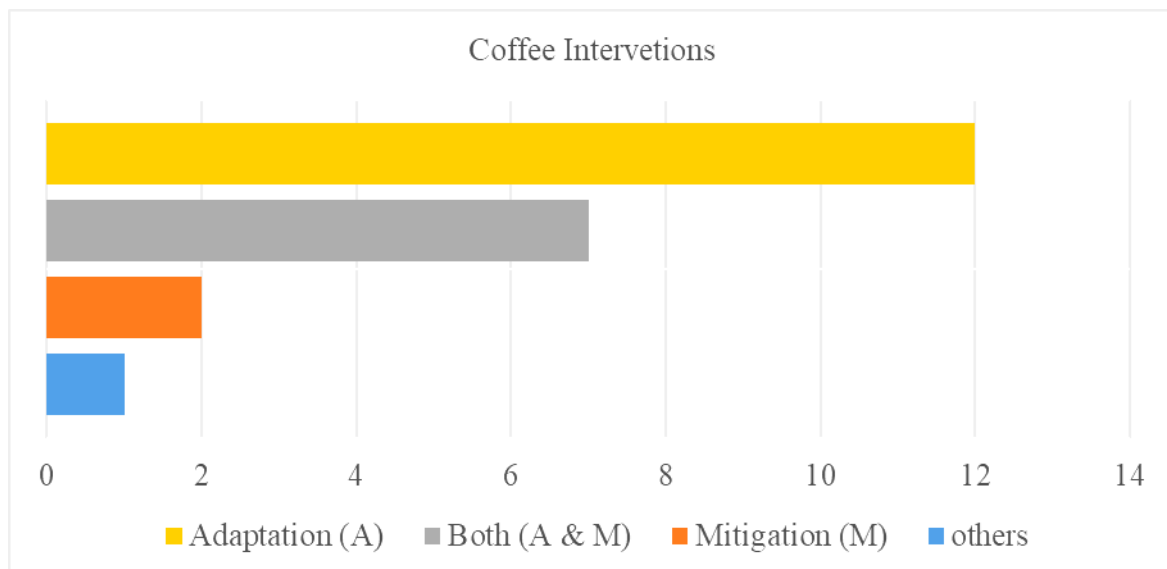


Figure 1.14. Nature and focus of coffee-related interventions in Tanzania

Source: Search engines, preliminary fieldwork in Tanzania, (2022)

Table 4. Coffee-related Interventions in Tanzania

Intervention	Start-End	Aim/Description	Targeted Geographical Area (s)	Lead Actor (s)	Funder (s)
Smallholder Coffee Development Project in Tanzania's Southern Highlands-CODE-P*	2020-2024	To contribute to better income and improve the nutrition of 24,000 smallholder farmers in southern Tanzania.	Songwe region- Mbozi & Ileje districts; Ruvuma region- Mbinga & Nyasa districts; Mbeya region-Mbeya district council & Rungwe	Vi-Agroforestry	European Union (EU) & SIDA
To Certification and Beyond*	2020-2024	Familiarizing farmers with certification schemes and voluntary sustainability to help them access better market opportunities.	Mbeya, Njombe, Ruvuma, and Songwe. Specific districts on coffee covered are Mbozi, Mbinga, & Nyasa.	Solidaridad	European Union (EU)
Passport to coffee export (PACE) project*	2020-2024	Training lead farmers of climate-smart practices.	Mbinga, Mbozi, & Mbeya Rural	Solidaridad	European Union (EU)
Sustainable Rejuvenation of Coffee Production in Western Tanzania*	2019-2024	To increase coffee production for improving the livelihoods of smallholder coffee farmers through training of extension officers on climate change and agroforestry, the establishment of coffee seedling nurseries and distribution, advocacy, and inclusion of women and youth.	Kagera region (all districts)	Café Africa	Jacob Douwe Egberts (JDE)
Kahawa ya Kesho program (literally means 'Future coffee')*	N/A	Focuses to motivate youth to engage in coffee farming.	Mbeya, and Songwe regions	Hanns R. Neuman Stiftung (HRNS)	N/A

Coffee and Climate Initiative (Phase 3)*	N/A	Supporting farmers and farmers' groups to adapt and mitigate climate change, access finance, facilitate extension services, and implement GAP.	Mbeya, and Songwe regions	Hanns R. Neuman Stiftung (HRNS)	N/A
Empowering smallholder families with a special focus on women and youth to increase their resilience to climate change through sustainable farming practices*	2020-2023	ICP targets to improve the livelihood of 4,000 smallholder households in Mbeya and Songwe in Tanzania.	Songwe, and Mbeya Regions	International Coffee Partners (ICP)	International Coffee Partners (ICP), Government of Sweden
Reducing GHG emissions and increasing yields from Robusta coffee production by 7,000 smallholder farmers and processors in Tanzania**	2021-N/A	Targets to reduce GHGs emissions from Robusta coffee production.	Kagera	Jacob Douwe Egberts (JDE)	Government of Germany, JDE Peet's, 4C Services GmbH
Climate-smart coffee and cocoa: from theory to practice (CSCC)***	2017-2019	Develop climate-smart coffee/Cocoa initiatives for climate change adaptation and Mitigation.	Mt. Kilimanjaro & Mbeya (Tanzania), and Uganda (Mount Elgon region, the greater Luweero region)	International Institute of Tropical Agriculture (IITA)	N/A
Adaptation for Smallholders to Climate Change (AdapCC)***	2007-2010	To support coffee and tea farmers in developing strategies to cope with the risks and impact of climate change.	Peru, Mexico, Nicaragua, Kenya, Tanzania, and Uganda	Cafédirect and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	N/A
Brewing up climate resilience in the coffee sector Adaptation strategies for farmers,	N/A	Knowledge sharing brochure with the aim to inspire action through examples of	Mexico, Honduras, Guatemala, Nicaragua, Costa Rica, Colombia, Peru, Brazil, Uganda, China, Ethiopia,	Hanns R. Neuman Stiftung (HRNS)	N/A

plantations, and producers**		successful intervention of the most pressing challenges.	Vietnam, Indonesia, Rwanda, Tanzania		
Carbon Offsetting Systems in Coffee Regions**	N/A	Providing smallholder families with financial rewards for investing and maintaining agroforestry production systems is a first step towards resilient livelihoods.	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras, and Guatemala	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A
Climate-smart Coffee Regions**	N/A	Aim to establish Coffee Smart Regions by promoting sustainable use of natural resources through providing training on climate-smart practices and implementing programs to protect forests and watershed areas within a specific coffee region.	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras and Guatemala	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A
Coffee Farmer Alliances Tanzania (CFAT)***	2010-2015	Addressing mid to long-term threats on coffee by paying attention to families that grow it to improve their livelihoods.	Arusha, Kilimanjaro, and Mbeya	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A
Empowering Youth to become climate leaders**	N/A	To train youth on coffee and climate to become climate leaders in their communities.	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras and Guatemala	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A
Gender Equality and climate action**	N/A	To introduce Climate Smart and time-saving techniques to address the time poverty of women.	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras and Guatemala	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A

Fostering knowledge and exchange of learnings**	N/A	To exchange knowledge on known and innovative climate-smart Agriculture practices between farmers, extension officers, and World leading climate experts.	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras, and Guatemala	Hanns R. Neumann Stiftung, ICP	N/A
Safe Use and Handling of Agrochemicals**	N/A	To support access to climate-smart practices and integrated pests and diseases management.	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras, and Guatemala	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A
Tanzania Country Program**	N/A	The Country Program follows a holistic approach to improving the livelihoods of 25,000 smallholder coffee farmers and their families through marketing and service linkages, organization development, advocacy and policy influence, production and quality enhancement, climate-smart agriculture, and gender and youth.	Tanzania (Country program)	Hanns R. Neumann Stiftung (HRNS)	N/A
Tools for further development of smallholder production systems**	N/A	Works towards establishing coffee production systems of the future. These systems shall be not only more resilient to the impacts of climate change but also improve the overall livelihood situation of smallholder coffee farming families through increased	Indonesia, Ethiopia, Tanzania, Uganda, Brazil, Honduras, and Guatemala	Hanns R. Neumann Stiftung (HRNS), International Coffee Partners (ICP)	N/A

		food security and diversification.			
Training for Coffee Agronomists**	2006- N/A	To invite and train agronomists on good agricultural practices, including also environmental, social, and climate change issues to improve yield and people's livelihoods.	Tanzania, Uganda, DRC	Cafe Africa	N/A
District Coffee Shows**	2006-N/A	To provide farmers with opportunities to taste coffee, learn about the market, see what is available for farm equipment and tools, fertilizer and inputs supplies, and how to cope with a changing climate.	Tanzania, Uganda, DRC	Cafe Africa	N/A

Key: *Ongoing, **Dates not known, *** Completed, N/A-Means Not available

Source: Search engines, preliminary fieldwork in Tanzania, (2022)

The summary above suggests that, international organizations have increasingly implemented interventions that support coffee farmers in different ways to adapt and mitigate impacts of climate change. Most of the interventions are done in collaboration with regulating authorities, local NGOs and research institutions such as Tanzania Agriculture Research Institute (TARI), TaCRI, and TCB. Figure 1.15 indicates that, comparatively, Hanns R. Neumann Stiftung (HRNS), has shown a long-term commitment to the coffee sector with focus on both adaptation and mitigation for climate change impacts.

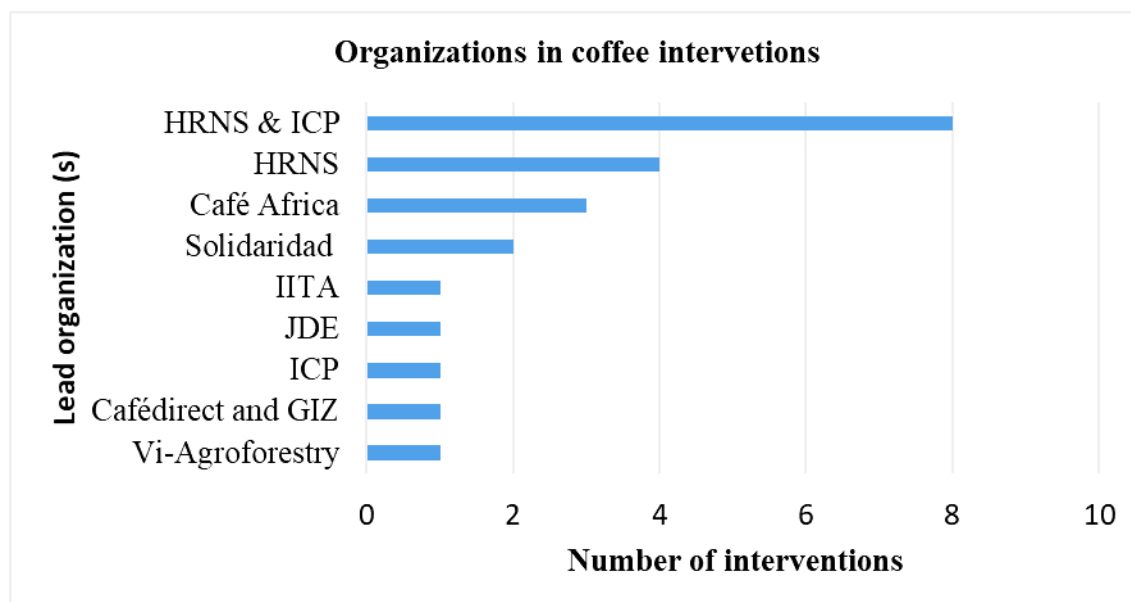


Figure 1.15. Key organizations implementing coffee-related interventions in Tanzania

Source: Search engines, preliminary fieldwork in Tanzania, (2022)

Key: *GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), ICP (International Coffee Partners), JDE (Jacob Douwe Egberts), IITA (International Institute of Tropical Agriculture), HRNS (Hanns R. Neumann Stiftung).*

In terms of geographical distribution, most of the interventions are found in the arabica coffee growing areas in the southern highlands. The exception is only two that are found in the robusta production area in Kagera region. This can be attributed to two issues; first, that research has established that robusta plants are relatively tolerant to climate stresses compared to arabica (Kath et al.2020), hence allowing most of the interventions to be directed towards the most affected areas. Second, the fact that coffee expansion is ongoing in the southern highlands where land is readily available for new arabica coffee fields hence attracting the attention of different actors. In this zone climate is also known to be relatively stable compared to the northern part of the country (Tanzania Coffee Stakeholders Report, 2018, Ruben et al. 2018).

4.1 *Fit of interventions with local circumstances*

While Figure 1.14 presents broad areas of focus for different coffee actor's interventions, Figure 1.16 below attempts to interpret qualitatively how these initiatives intend to influence the current and future practices in coffee production areas. It is also important to pay attention to Figure 1.15 which indicates that none of these interventions are local initiatives, which raised the questions of how far they serve the interests of farmers. In the meantime, the initiatives can broadly be interpreted as vehicles for safeguarding the interests of powerful actors in the coffee value chain especially in relation to sustainability of production (and supply) and the quality required by the market. Consider, for example, that the dominant actor, Hanns R. Neumann Stiftung, is the implementer of International Coffee Partners (ICP) in relation to adaptation and mitigation of climate change impacts on coffee. This is done by influencing the knowledge and interest on coffee for the current generation of youths and women (who are the drivers of change) to shape the future of coffee in rural areas (<https://www.hrnstiftung.org>).

Likewise, despite the obvious business interest in coffee, Café Africa's initiatives are identified with unlocking wealth in rural areas across Africa and to provide sustainable livelihoods for millions of people (<https://www.cafeafrica.org>). Promoting coffee as an engine of economic growth, rural employment, and improved smallholder livelihoods is attractive locally hence potentially a means to influence future terrain in support of coffee production.

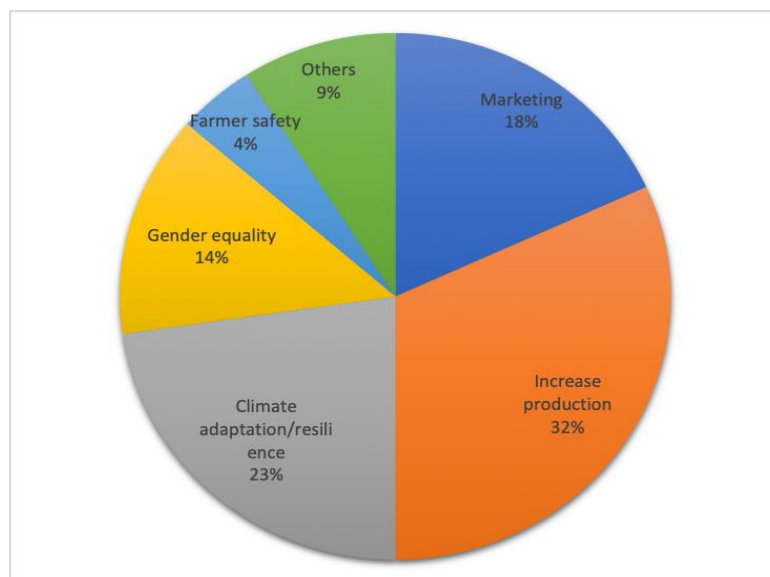


Figure 1.16. The focus of coffee actor interventions

Source: Authors

Overall, the partners operate within broad frameworks of global SDGs and Agenda 2030. Supporting women, youth and smallholder farmers to attain better living conditions appears noble. However, it

is also obvious that most actor's interests are to increase quality, quantity and market competitiveness of Tanzanian coffee which involves engagement investments in certification, sustainable farming practices, rejuvenation and expansion of coffee production as well as marketing and climate change adaptation/resilience. Less attention is paid to other issues that are critically important for sustaining local livelihoods including farmer's safety against agrochemicals. As fieldwork is still in progress, questions remain unanswered including whether the interventions are locally acceptable and useful or rural folks are fulfilling the interests of powerful actors? Whether coffee production is indeed empowering or disempowering farmers and in what ways and the social dynamics that are emerging from these new interventions.

5. Conclusion

This paper has attempted to document the history, continuities and discontinuities in coffee industry of Tanzania. It highlights the important trends in coffee production, regulation and marketing of coffee with particular attention to the governance structures and actions of stakeholders, their roles, interests and interventions in the coffee industry. The paper has also analyzed climate change trends and impacts in terms of temperature and rainfall variability and ways that they affect current and future plans for coffee production. Key actors whose different interventions focus on building farmer's adaptation to climate change are discussed. The main trend here shows that private initiatives and those of NGOs have played crucial roles in facilitating smallholder coffee farmers in improving coffee productivity, quality, and building climate-resilient coffee in Tanzania. So far, these interventions have worked towards livelihood upgrading through improvement of coffee quality as well as addressing gender inequality in terms of decision making and income distribution at the farmer-level as well as throughout the local coffee value chain; production, processing, marketing.

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