Gender and Climate Smart Agriculture: Solutions in a Rural Setting of Tajikistan (literature review, theory, research questions, and proposed methodology)

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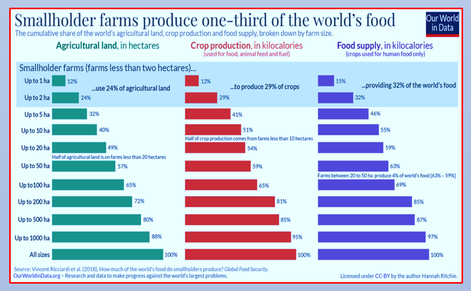
Study Goals

Climate change is negatively impacting all aspects of agricultural production, including the components of food security, such as food prices, rural agricultural production, and household incomes. Through literature review on Climate Smart Agriculture (CSA), I plan on finding the gap in this work pertaining to the role of women in local approaches to smallholder agriculture and the communal impacts of agricultural sustainability practices with a focus on Tajikistan. I hope to study the challenges faced by female farmers in implementing climate-smart smallholder agriculture and, once implemented, how this agricultural practice is unfolding. The research will also examine how factors such as demographic profile, financial position, and farming history impact the adoption of CSA amongst this group of smallholder farmers. This research will support work on addressing gender-specific differences and challenges in the adoption of CSA and lay the foundation for gender sensitive policies to support female owned farms within the backdrop of small farm vulnerabilities to the impacts of climate change. Utilizing community-based participatory research I will study how rural women connect and encourage each other through family-systems and community networking in support of their smallholder agricultural initiatives. Perspectives of women researchers have "been underrepresented" (Mubarak 2023) in climate change conversations.

Smallholder Agriculture

Smallholder farms and the farmers that manage these farms feed the world. Smallholder agriculture is a crucial part of any national development plan, and support of farmers to improve the viability of this venture is linked to a reduction in poverty, improved food security, and increased nutritional outcomes (Fan & Rue, 2020). To keep smallholders operational and reduce land abandonment, increased governmental supports along with increased farmer political power have shown positive results in maintaining this agrarian development tool (Fałkowski, 2018; Movahedi, et al., 2021). As essential components of a local economy, especially in developing countries, smallholder farms can play an important role in environmental preservation efforts through engagement in crop diversification, agroforestry, smart water use, and integration of crop and livestock systems among other activities (Akanmu, Akol, Ndolo, Kutu, & Babalola, 2023).



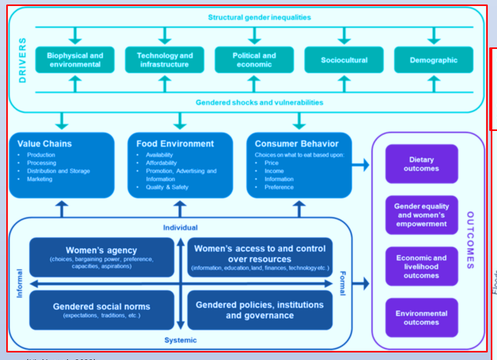
Climate Smart Agriculture (CSA)

CSA is an approach to "transform and reorient" agriculture that supports local and global sustainability efforts in the face of climate change, while also advocating for food security, equitable increases in income, and rural development (FAO 2013, Lipper 2014). Food production is directly responsible for about 25% of global greenhouse gases (GHG) emissions with crop production accounting for 27% of this number (Ritchie, Rosado, & Roser, 2022). CSA is a method to increase agriculture productivity while doing so in a sustainable manner while considering the realities of climate change. CSA is an approach to "transform and reorient" agriculture that supports local and global sustainability efforts in the face of climate change, while also advocating for food security, equitable increases in income, and rural development (FAO, 2013; Lipper, 2014; FAO, 2021).

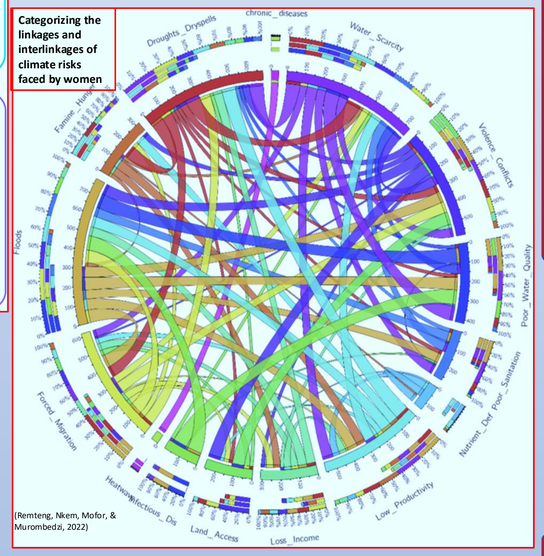
Women, Climate Change, and Agriculture

Women are not men, therefore the impact of feminist geographies as it relates to climate smart agriculture within the context of historical power dynamics, cultural social norms, and country-specific governance blind spots needs to be considered in the climate change mitigation debate (Arora-Jonsson, 2014; Gay-Antaki, 2020; Huyer, Loboguerrero, Chanana, & Spellman, 2024). Comprising 43% of the agricultural labor force, women do the bulk of the farming in poor countries (FAO, 2009). Even with this workforce influence, women's access to credit, legal land rights or title, and policy influence are restricted by gender biases (Afolayan, 2023). According to the Food and Agriculture Organization (FAO) women are the "quiet drivers of change" and with the same resources as men, they could increase harvests on their farms by 20 percent to 30 percent resulting in 100-150 million people being lifted out of hunger (FAO, 2009). For CSA to fully meet its potential in the most at-risk regions of the globe, the concepts of unequal access to recourses, unequal access to power, and unequal access to justice need to be part of any policy discussion (Nelson, Meadows, Cannon, Morton, & Martin, 2002; Chandra, McNamara, & Dargusch, 2017).

Women respond to, and are affected by, the impacts of climate change differently than men and because of their importance in communal life they can be powerful agents for climate friendly and climate adapted agriculture (FAO, 2013; WHO, 2014; Kristjanson, et al., 2017; ESCWA, 2022). Women are more impacted by the negative impacts of climate change as they are more involved in low skilled nature-based work, do not have the education or skills (usually culturally limited) to work outside the smallholder farm, take on additional work during adverse climate events (walk further for the household water during droughts, repair home and farm infrastructure during floods, etc.), and fill-in for the male head of household who migrates to an urban center for employment if the farm experiences climate related failure (Nyasimi & Huyer, 2017; IOM, 2024). Empowering women to utilize their site-specific knowledge and supplementing this knowledge with access to climate related information, education, training, and mitigation solutions, along with a systematic approach to policy and governance directed at increasing female participation CSA, is essential in reducing and even reversing the climate risks they are encountering (Tsige, Synnevåg, & Aune, 2019; Glazebrook, Noll, & Opoku, 2020; Njuki, et al., 2022; Remteng, Nkem, Mofor, & Murombedzi, 2022). It is with this backdrop that emphasis must continue in increasing women's voices in the global, national, and communal climate smart agriculture debate to not only combat the negative effects of climate change in agriculture but to also attack the gender gap in agriculture.

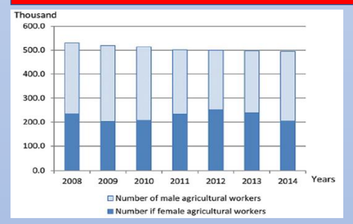


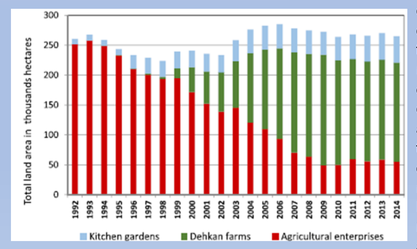
(Njuki, et al., 2022)



(Remteng, Nkem, Mofor, & Murombedzi, 2022)

Tajik Women in Agriculture





Climate-smart agriculture

1. Sustainably increasing agricultural productivity and incomes
2. Adapting and building resilience to climate change
3. Reducing/removing greenhouse gas emissions

Tajikistan

Climate Change Impact Projections

Compared to the 1986-2005 level, the **annual mean temperature of Tajikistan** is projected to rise between **1.3°C and 6.3°C by 2080**, depending on the future GHG emissions scenario. Under the high emissions scenario, RCP8.5, annual temperatures will increase by approximately **1.7°C in 2030, 3.1°C in 2050, and 5.4°C in 2080**.

Winter precipitation will increase while spring precipitation will likely remain at its current level. However, based on the same model ensemble, **heavy rainfall events (>20 mm) will increase during the spring months.**

Climate change will likely **increase** the existing **vulnerabilities and risks for infrastructure. Roads are particularly susceptible** to damages induced by **changes in temperature** and **extreme heat. Moreover, changes in river flow levels would lead to fluctuations in hydropower generation.** Further **climate-related risks** identified regarding infrastructure are **mudflows, droughts, high temperatures,** and **strong winds**.

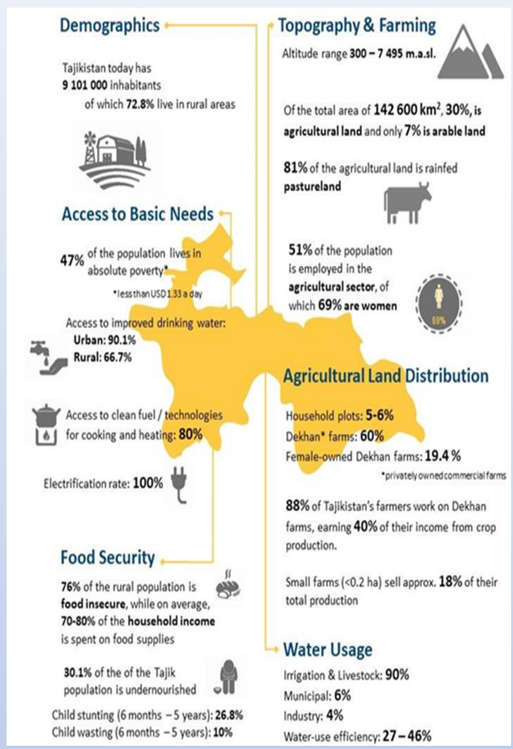
The **Growing Season Length (GSL)** is **expected to increase**. Under the high emissions scenario, RCP8.5, GSL will be approximately **150 days in 2030, 165 days in 2050, and 200 days in 2080.** Increased temperatures, however, counteract the positive effect of a longer GSL.

Increasing temperatures will lead to a **retreating snowline and** a **loss of glacial mass** which will cause a **decrease in water storage capacity. Increasing temperatures will generate** an **increase in the variability of river discharge** as well as **fluctuations in water availability and quality**; therefore, negative repercussions on agriculture are to be expected. Additionally, increasing temperatures are associated with a likely **increase** in the **risk of spring flooding** and **glacial lake outbursts** during snowmelt.

As a consequence of increasing temperatures, **fewer frost days will occur**. Under the high emissions scenario, RCP8.5, frost days will decrease **to approximately 212 days in 2030, 200 days in 2050, and 170 days in 2080**.

The **number of heat days above 40°C is expected to increase by 12.5 days by 2080** compared to the 1986-2005 period. Consequently, this will lead to an increase in **heat-related health issues** such as **heat stress** and **heat-related mortality.** An increase in **food insecurity** in conjunction with an expected **reduction in agriculture** and **pasture productivity** will likely cause negative effects on the already-critical **nutritional status** of the population. An increase in **gastrointestinal infections** is projected alongside an increase in floods, **flood-related water contamination,** and the increase of exposure to **water and foodborne diseases. Frequent** and **severe infectious disease outbreaks** are more likely because of climate change, **as is the re-emergence of Malaria.**

Despite an extended GSL, the **agricultural productivity** during the growing season is **at risk** due to **rising temperatures, more frequent and intense heatwaves**, as well as the risk of **less irrigation water availability** due to higher evaporation and glacier retreat (especially in late summer).



Working Research Theory

Numerous theories have been developed to identify the role of women in their own empowerment, such as feminist theory, equity approach, empowerment approach, and gender and development approach. This research will rely on the feminist agrifood systems theory (FAST) which suggests that women farmers can create a more feminist agriculture by:

- Creating gender equality on farms
- Establishing a farmer identity
- Accessing more resources
- Shaping new food and farming systems
- Negotiating roles in agricultural organizations

During the Soviet era, the Kolkhoz and Sovkhoz farms espoused the communist perspectives on gender role, having men and women take on equal responsibility for farm management. The Soviet gender norms conflicted with the preexisting Islamic and rural Tajik customs, which assign all formal authority to men; the introduction of the Tajik constitution affording men and women equal rights did not change Tajik gender customs. Building on these informal structures, male and female roles in Tajikistan are highly defined, women are in a subordinated position to men, lack household power, and on the farm, women are mostly responsible the manual work and men taking on the mechanized work (Hofman, 2018). With the economic challenges facing Tajikistan, many families have had to rely on male out migration for supplemental income. Approximately 95% of these male laborers are coming from rural areas, resulting in majority female regions that in turn push women to take on traditional male roles, especially in the agriculture sector, changing the traditional male dominated social norms (Mukhamedova & Wegerich, 2018). One such change can be seen in the role women play as workers outside the home as a Kolkhozchi (collective farm worker) or a Mardikor (day laborer or helper) working in jobs that are considered predominantly agricultural. The outmigration of males has resulted in a feminization of agriculture, with women becoming the dominant participants, increasing the percent of women who are economically active outside the home (ADB, 2020). Agriculture employs 60% of the Tajik population but 80% of agricultural land is owned by men, with the same percentage leading local 'dekhans 'or farms (United Nations , 2024).

Research Questions and Proposed Methodology

Research Questions

1. Does access to land to land in the form of informal or formal control impact women's use of CSA practices?
2. Do social, cultural, or institutional barriers to accessing agricultural technology impact women's use of CSA practices?
3. Do women's agency in decision making impact women's use of CSA practices?
4. Does access to and participation in community groups impact women's use of CSA practices?

Proposed Field Work Methodology

Study areas

The proposed study area will be a region or village. Details of research scope will be finalized based on permissions granted by the Tajik government.

Research design

The initial approach will be either a mixed methods research design where both qualitative and quantitative data were collected sequentially within the same study or a qualitative study based on interview data. The approach will be guided by Tajik government access permissions.

Data collection and instrumentation

Once a research location and scope has been approved, data collection will be conducted by the author and enlisted help from trained local researchers. Qualitative data will be collected from a set of key informants at the approved site. Initial steps will be to capture descriptive data on all participants (age, education, family size, region, land size, farming assets, etc.). Also, investigation of CSA techniques awareness and adoption of CSA techniques will be conducted via the questionnaire. Road blocks to adoption along with other factors will be a part of the questionnaire. Data collection methods utilized will be: Face-to-face interviews- structured and semi-structured, Snowballing, Desk reviews, Ethnographic observation, Focus group discussions (FGD), Key informant interviews (KIIs). Survey questions based on: The three pillars of CSA- productivity, adaptation, and mitigation and Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) domains of empowerment as the framework.