The transition from cotton to horticulture in Uzbekistan: Effects on women's empowerment

Suray Charyyeva & Thomas Herzfeld

Conference paper for Allied Social Science Association (ASSA) 2024 Annual Meeting

5 – 7 January, 2024

San Antonio TX, USA

Abstract

In developing countries, diversifying crop production improves household nutrition, creates substantial employment possibilities in rural areas, especially for women occupying a dominant place in most stages of production and processing, and promotes sustainable agriculture. While Uzbekistan is transitioning from cotton monoculture to limited-scale horticultural crops on individual farms *(fermer xojaligi)*, the specific impact of this transition on rural women's empowerment remains unclear. This research examines the effect of crop diversification on rural women's potential empowerment. Thus, the study's research question is: How does cultivating horticultural crops impact the roles, economic activities, decision-making, and collective action (empowerment dimensions) of female farmers and female daily workers compared to their counterparts in cotton-oriented villages? Taking the dimensions of women's empowerment proposed by Kabeer (1999) as a conceptual starting point, in-depth interviews were conducted in four districts of Uzbekistan between September and December 2021. We compare the opportunities of rural women in two different agricultural systems practised in Uzbekistan, cotton and non-cotton, and between two different status groups, farmers and daily workers. A qualitative design was used to explore the effects of a more liberal commodity policy on rural women. The study found several positive outcomes associated with the shift to horticultural crops for farmers, including increased decision-making power (exercising agency). In addition, for daily workers in non-cotton regions, the policy led to increased employment opportunities and a longer period of economic activity throughout the year, contributing to their economic empowerment.

Keywords: Rural women, female farmers. daily workers, female empowerment, horticulture sector, Uzbekistan

JEL codes: J43; O15; Q12; Q18

Introduction

The shift from state-planned agriculture to a market economy occurred in many post-Soviet countries in the late 1990s and early 2000s (Csaki et al., 2006). However, in some Central Asian countries, such as Uzbekistan, agricultural policy is still based predominantly on the cotton economy. Following its main export product, minerals, Uzbekistan also exports cotton, ranking second. The country is one of the ten largest cotton exporters in the world. When Uzbekistan became independent in the 1990s, cotton remained under state control, as did land ownership, resource allocation, marketing, and processing channels (Lerman, 2008; Sadler, 2006).

Economic growth has led to expanding the domestic market for horticultural products. Hence, since 2010, the Uzbek government has allowed very few districts to grow horticultural crops (in total, three districts: Jomboy in Samarkand province, Yangiyo'l in Tashkent province, and Asaka in Andijon province). However, the scale remained limited, especially compared to the widespread cotton-wheat-oriented districts (Larson et al., 2015). Despite changes in the structure of cotton production since 2017, including the transition of cotton production management from the state to clusters and the abolition of the state quota procurement system in 2020, the state still retains significant control over all agricultural production[1] with the land allocation programs.

In contrast to the strict state policies of cotton-wheat cultivation on public land leased to private farmers, horticulture benefits from increased flexibility. Private cotton-wheat farmers have to deliver specific amounts of their output in exchange for leasing government land. Conversely, private horticulture farms have a little bit more freedom to choose crops and production methods. The government has a separate horticulture policy emphasising private investment and market-based approaches.

In the agricultural sector, crop diversification by growing high-value crops such as vegetables, melons, fruits and other horticultural crops is considered a meaningful way to secure agricultural livelihoods, promote faster growth and reduce rural impoverishment (Bobojonov et al., 2013; Feliciano, 2019; Gupta & Tewari, 1985; Pretty et al., 2003). Feliciano (2019) summarises the economic outcomes of crop diversification as a significant increase in farm income and greater financial sustainability. In addition, with the right approach, crop diversification can be used to promote job opportunities and enhance employment by extending the agricultural season, reducing poverty, and conserving valuable soil and water resources (Emana et al., 2015; Kerr et al., 2007; Makate et al., 2016; Teklewold et al., 2013).

According to the literature, many examples of positive socio-economic and environmental outcomes of the transition from mono-culture to horticulture exist. Emana et al. (2015) reported that most farmers in Ethiopia buy farm and home-related items with income from vegetable production, improving living standards. New labour market opportunities from horticulture production have benefited women, particularly breadwinners and daily workers in agriculture (Dolan & Sorby, 2003;

[1] http://tashkenttimes.uz/national/541-uzbekistan-s-development-strategy-for-2017-2021-has-been-adopted-following-discussion 30.11.2023

Van den Broeck & Maertens, 2016). However, cotton requires much manual work during the harvest season, which lasts only a few months (in total, 1.5-2 months in autumn). Due to low wages, cotton harvesting is usually unattractive for men, and a large share of this work is done by rural women (FAO, 2019; ILO, 2017; Kandiyoti, 2002; Lerman, 2021; Najjar et al., 2022).

Whether or not one can take advantage of employment opportunities in the emerging horticultural sector depends on several factors, from shifting responsibilities for household chores to accepted gender norms in society and the family itself. Changes in women's quality of life are more likely to prioritise basic needs and collective well-being, especially concerning children. An indirect impact of crop diversification through increased horticulture production offers opportunities not only for women but also for women's nutrition and maternal and child health. Researchers have also noticed increased child education (Ochieng et al., 2017; Pretty et al., 2003; Snapp & Fisher, 2015; Van den Broeck & Maertens, 2016). However, the literature does not support one clear causal relationship between cropping diversification to better nutrition, health, and education.

While women may have advantages in employment, their comparative advantage may lie in lower wages and the acceptance of worse working conditions, jeopardising the long-term prosperity and empowerment of themselves and their families (Cagatay, 2001). Underlying reasons might be social norms and intra-family issues determining whether women can gain by participating in the labour market. For example, due to negative cultural stereotypes, women may enjoy limited daily mobility to travel for work, or women who cannot delegate unpaid household work, such as those who do not have daughters, daughters-in-law or mothers-in-law, to help with household chores, may find it difficult to take advantage of employment opportunities. On the other hand, the eldest daughter in the family may drop out of school or receive a poor education due to the mother's absence, which may also be applicable in Central Asia (Dolan & Sorby, 2003; Teklewold et al., 2013). Furthermore, Van den Broek et al. (2016) note that due to increased workload on the farm, food quality in workers' families may decrease, leading to families receiving less nutritious food.

This paper investigates in how far women's empowerment differs between cotton and horticultural villages in Uzbekistan. The main question guiding this study is as follows: *How do the roles, economic activities, decision-making, and collective action (empowerment dimensions) of female farmers and female daily workers in horticulture villages differ in comparison to their counterparts in cotton-oriented villages?* To answer these questions, we apply two of Kabeer's (1999) dimensions of empowerment—resources and agency (individual and collective agency) —while structurally comparing two divergent farm systems. Backed up by the literature, we hypothesise that women who work daily in agriculture will gain more economic opportunities, leading to economic empowerment than women who work daily in cotton. Simultaneously, we hypothesise that female farmers in the same areas will enjoy greater access to resources and participate in better decision-making processes compared to cotton farmers. The analysis is based on 40 in-depth interviews conducted with farmers and workers across four districts in Uzbekistan: two are cotton-wheat-oriented districts, and two are horticulture-wheat districts. Qualitative data were gathered in 2021.

The National Statistical Agency of Uzbekistan reports that in 2020, 42.4 percent of agricultural labour was done by women. But as the majority of jobs as cotton picking during harvesting season is informal labour and not visible in the statistics; also, according to the report of FAO (2019), only four percent of farmers in Uzbekistan are women (gender.stat.uz, FAO 2019). It means women are primarily engaged in low-skilled manual labour, that is, seasonal or unpaid family workers, such as cotton pickers, and only very few women are in managerial positions. Hence, the motivation behind our focus on women in this study extends beyond their involvement in low-skilled manual labour, such as cotton picking or horticulture daily workers. While acknowledging this aspect, we recognise the profound and multifaceted impact that empowering women can have on various dimensions of society. Women, as key contributors to agricultural activities, play a pivotal role not only in sustaining rural economies but also in influencing broader aspects of well-being.

Furthermore, the topic of rural Uzbek women, especially female farmers, lacks sufficient and reliable data. Studying female farmers in Uzbekistan can generate important insights to inform future reforms. Given the small number of female farmers and the low political attention paid to daily workers, some scholars argue that agricultural policy in Uzbekistan lacks gender sensitivity (FAO, 2019). In addition, the horticulture sector at the individual farm level in Uzbekistan is gradually becoming more prominent. Thus, this article contributes to the literature by presenting evidence-based arguments to encourage the government to shift to a more liberalised agricultural policy. Finally, the collective action of daily workers, so-called self-organised brigades (SOBs), scrutinised in this analysis can play a pivotal role in participatory rural development processes.

The rest of the article is structured as follows. In Section 2, we will look at the history of the horticultural sector and discuss the state of women in Uzbekistan. Section 3 presents our conceptual framework within Kabeer's (1999) three dimensions of empowerment. Section 4 introduces our data, and Section 5 presents the paper's main results. The last section concludes this study.

2. Contextualising Uzbekistan

2.1. The Cotton and Horticulture Sectors of Uzbekistan

Uzbekistan is a highly agrarian country, with 49 percent of the population living in rural areas and ca. 26 percent of employment in that sector (as of 2019). The World Bank reported that in 2020, agriculture accounted for 25 percent of the GDP. The agricultural reforms in 2007 resulted in a sector composed of three main groups of agricultural producers: individual farms or *private farms* (*fermer hojalik* - independent legal entities using land under a 49-year lease contract and producing state/cluster ordered crops), dekhan farms (*dekhan hojaligi* - households with small plots of land either close to their house or in more remote locations) and production cooperatives (other agricultural enterprises as a legal entity) (World Bank, 2019).

In 2017, the new president's economic reforms created the first cotton cluster. In Uzbek's understanding, clusters are circles of businesses and investors offering farmers the intermediary inputs and capital they need to produce cotton/wheat or vegetables. These farmers sign contracts with clusters instead of the agro-industrial complex (AIC) or local *hokimiyats* (administrations)

committing them to produce the respective crop.[2] The production cluster controls the cotton value chain from cultivation over harvest and processing to fibre as the final output.[3] Since then, the number of cotton clusters has increased every year, and also the number of wheat and vegetable clusters has grown gradually in some districts (Babadjanov & Petrick, 2023). In 2020, the Uzbek government lifted the mandatory state cotton procurement quota and transferred this power to cotton clusters. Nevertheless, farmers still face a strong monopsony market because they must sell the raw cotton they produce to a predefined cluster in their area.[4] Furthermore, there are districts without any cluster where the AIC still controls cotton production and marketing. After introducing the cluster system, Zorya et al. (2020) and Babadjanov et al. (2023) provide further details of the Uzbek cotton sector.

Despite the political interest in cotton, the Uzbek government steadily increased the area under horticultural production. In 25 districts suitable for horticulture, more than 500 private wheat and cotton farms were converted to horticulture farms in 2011. Among them are 288 private farms in Jomboy (Samarkand Province), 113 private farms in Yangiyol District (Tashkent Province), and 112 cotton-and-wheat farms in Asaka District (Andijan Province) (Larson et al., 2015). These farms cultivate vegetables, melons, fruits and vegetables, grapes, and other crops.

Historically, cotton and wheat enjoyed a high political priority as either major export products or to secure the nation's food security. That is why farms in both cotton and horticultural districts are still obliged to cultivate wheat (FAO,2019). In horticulture-oriented districts, wheat occupies at least half of the land with an AIC/*hokimiyat*/cluster contract. Roughly one-third of the land is under a horticulture production contract with the AIC/*hokimiyat*/cluster. Only for ten percent of the land, farmers have no obligation to sign a crop contract. For all agricultural products, regardless of which crop the farmers have a contract with the AIC/cluster, these contracts specify quantities to be delivered and the exact price, usually below the market price. This has been handled very strictly in the cotton villages. However, for food crops, farmers have the opportunity to sell the above-quota harvest at the market price (interview with AIC officer; Zorya & Babaev, 2020).

2.2. The Overall Situation of Women in Uzbekistan

Uzbekistan, like many Central Asian countries, adheres to a patriarchal structure in which men predominantly lead households. In 2020, only 18.1 percent of all households in Uzbekistan were headed by women (gender.stat.uz, 2022). According to Lerman (2021), female-headed households in Central Asia, specifically those in agriculture, tend to be smaller and less wealthy than male-headed households. Decision-making power belongs to men, mainly to the head of the household. Hence, gender roles are also strictly clear for Uzbek families: while men earn money outside the home, women should care for the house, children, and elder parents. Even though women might be economically active, they are supposed to do household chores as they are related to motherhood and the house (FAO, 2019; Kandiyoti, 2002; Najjar et al., 2022). As data from *gender.stat.uz* shows

[2] https://changeinuzbekistan.com/uzbek-cotton-reform/ (1.09.2022)
[3] https://www.agro.uz/ru/11-0295/ (23.7.2022)
[4] https://uzts.uz/ru/hlopkovo-tekstilnye-klastery/ (23.7.2022)

that the average number of hours spent by women on unpaid housekeeping in 2018 was 5.27 hours per day (without childcare). Meanwhile, men spent 2.15 hours daily on unpaid housework. Female earnings are typically owned and shared by the man in the family, by either husband/father or father-in-law, who has the right to make all decisions in the household. In many situations, women do not have either direct or indirect control over their income (Kandiyoti, 2002; Lerman, 2021; Najjar et al., 2022).

Despite that, women in Uzbekistan are active in the labour market. They represent an economically essential resource contributing considerably to the country's economic and social life. The employment market is divided along gender lines *(see Table 1)*; there are specific jobs where men or women predominate. While women and men are rather equally represented in agriculture, trade and manufacturing, construction and transportation sectors are clearly male-dominated. Meanwhile, education and health are female-dominated. However, despite the equality of the sectoral employment shares, women occupy less managerial positions. In the case of agriculture, only four percent of farm managers are female.

Table 1: Employment divisions by gender in Uzbekistan, 2020, percentage

Economic sectors	**Women**	**Men**
Agriculture, forestry and fisheries	27.1	26.0
Manufacturing industry	13.5	11.1
Construction industry	1.5	15.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	12.7	9.1
Transportation and storage	0.8	7.3
Public administration and defence; compulsory social security	3.2	5.9
Education	15.8	3.7
Health care and social services	9.3	2.0
Provision of other types of services	9.2	11.0
Other sectors	6.9	8.1
Total	**100**	**100**

Source: *gender.stat.uz*

Note: The share of each sector is calculated based on all employed women/men across all economic sectors, totalling 100 percent for each gender.

As discussed earlier, in the context of family relations, financial decisions are mostly made by men, and inheritance traditionally favours the youngest son in families. Consequently, women in such families are often dependent on men. The definition of “land” is not defined clearly, and it is very tricky. It can be either agricultural land, or a *tomorka* (garden or small plot near the house), or land on which a house is built where the family lives.

Figure 1: Share of female labour in agriculture and female land owners, percentage

Source: gender.stat.uz, 2021

Note: The percentage of women employed in the agricultural sector is derived from the total number of people exclusively employed in agriculture. In 2020, women constituted 42.4 percent of the agricultural sector workforce, while men accounted for 57.6 percent. The same calculation for land owners, in 2020, shows that 77 percent of land owners were men.

In addition, ownership of movable and immovable property is very rare for women. In 2020, 23 percent of women in Uzbekistan owned land (unclear what kind of land, not defined) (see Figure 1). The share of women who own land varies between 14 percent to 29 percent by provinces (check the gender.stat.uz). But we must remember that significant underlying gaps exist between provinces, rural and urban populations, and the poor and non-poor.

2.3. Uzbek Women's Role within Agriculture

Focusing more on women's role in agricultural production and rural areas, informal arrangements represent a pretty common status. Lerman (2021) noted that women's position in the region's predominantly small-scale agricultural context that has emerged since 1992 had changed dramatically: While working as part-time workers on collective and state farms and small "backyard" garden plots in the past, women are now full-time workers on family farms. Although rural women classified as unpaid "housewives" are economically inactive, they participate in informal and part-time/daily work or unpaid work on family farms. Unfortunately, rural women in Uzbekistan have limited opportunities for off-farm work (FAO, 2019; ILO, 2017; Kandiyoti, 2002; Lerman, 2021; Najjar et al., 2022).

Women's engagement in agricultural production can be classified into four categories: a) managers of private farms *(fermer xojaligi)*; b) owners of dekhan farms; c) unpaid family workers; and d) daily workers in agriculture, such as cotton pickers. Simultaneously, one woman might engage in more than one category, such as being a dekhan farmer and a daily worker on a different farm at the same time. Similarly, a daily worker can engage in unpaid farm work within the own family or extended family.

As mentioned above, four percent of farm managers are officially women. However, this share could be even lower in reality. In some Uzbek families, it is common to register some businesses and farms

in the name of women (interview with the AIC officer). These "*women farmers*" do not have actual control over these farms. Furthermore, FAO (2019) emphasises that female farm managers face trust problems with local administrations and the AIC, which works together with local *hokimiyats* (administrations). In addition, they have limited access to finances (FAO, 2019; Lerman, 2021).

As already mentioned, most agricultural tasks fulfilled by women are low-skilled manual labour. In cotton-growing regions, the daily cotton pickers are primarily women looking for cash income (FAO, 2019; ILO, 2017). Daily work is often informal and limited to certain seasons/months. Although the paid wages supplement the family budget, the informal employment status often deprives women of social benefits, such as sick leave, health insurance, vacation, or pension contributions (Lerman, 2021). However, little is known about the detailed situation of female farmers and daily horticultural workers in Uzbekistan (FAO, 2019; Larson et al., 2015).

In some villages, daily workers act in the form of self-organised brigades (SOB). It is a group of women who work together, and there is one head who manages the communication with the farmers, organises working days, allocates tasks, and distributes the earnings. These SOBs emerged particularly in horticulture districts. They are usually consistent from year to year. Farmers prefer to work with them as it is more efficient than hiring workers individually. SOB members enjoy greater opportunities as they can choose the farmers they work for and jointly negotiate their wages and working conditions (ILO, 2017). However, not every district has daily workers in self-organised women's brigades, especially cotton districts. This appears to be due to the structured nature of work in cotton production, where workers are informed in advance of specific tasks and harvest schedules (ILO, 2017). In contrast, horticultural production presents a more dynamic scenario due to the diversity of the specific crops and, consequently, different dates of specific tasks. Farmers usually contact the SOB leader in these areas to inform them of upcoming work, representing a more flexible and variable system than the more predictable cotton harvest seasons.

3. Conceptual Framework: Empowerment in Rural Uzbekistan

One of the most promising routes to realising women's potential and advancing their rights is empowering them. In the literature, the empowerment dimension includes the ability to (a) take initiative in shaping one's life, (b) actively participate in decision-making processes, (c) exercise control over income and various assets, which indicates economic independence, and (d) enjoy freedom of movement. This concept, often called economic empowerment, is widely used in the literature (Deshmukh-Ranadive, 2005; Malhotra & Schuler, 2005; Narayan, 2005). Women's empowerment extends to other dimensions as well, including social and cultural (e.g., ability to make decisions related to childbearing, control over sexual relations, freedom from violence, etc.); legal (e.g., awareness of and support for legal rights, etc.); and political (e.g., understanding political systems and how to interact with them) (Malhotra & Schuler, 2005).

Enhancing women's empowerment in the agricultural sector can bring economic benefits. The term "empowerment" is not clearly defined and can be interpreted differently. It is often understood as a broad concept and outcome, typically involving three key dimensions: opportunity, agency, and well-being outcomes (Alsop & Heinsohn, 2005; Kabeer, 1999). In other words, it provides opportunities

for women to make decisions and achieve meaningful outcomes for themselves and their families. For agriculture, empowerment can be defined as expanding or improving women's decision-making capacity using agricultural resources, management and production, and spending earned income (Anderson et al., 2021).

Several approaches to measure empowerment have emerged in recent years. Alkire et al. (2013) developed the Women's Empowerment in Agriculture Index (WEAI). It provides a comprehensive conceptual framework and operational guidelines for measuring rural women's empowerment. This survey-based approach aims to measure the empowerment, autonomy, and inclusion of women in agriculture in five key areas: (1) agricultural production decisions, (2) access to inputs and decision-making power, (3) control over income utilisation, (4) community leadership, and (5) time allocation (Alkire et al., 2013). Subsequently, the methodology was refined, and IFPRI researchers introduced a pro-WEAI study consisting of ten dimensions along with two additional dimensions (a total of 12 dimensions) (Malapit et al., 2019). This expanded framework considers three types of agencies - internal agency, instrumental agency, and collective agency. While the pro-WEAI survey provides a rich data set, it is complex, time-consuming, and resource-intensive, creating data collection challenges.

Kabeer (1999) presents an alternative approach which offers a more pragmatic route. These empowerment measures have served as the basis for various indices in the literature. Similarly, multiple indices and questionnaires can be found in the literature to assist researchers in making empowerment measurements (Alsop & Heinsohn, 2005; Elias et al., 2021; Kabeer, 1999; Meinzen-Dick et al., 2019; Newton et al., 2019; Quisumbing et al., 2022). In adopting Kabeer's framework as the foundation for our study, we draw upon a robust and comprehensive basis for comparing and measuring empowerment.

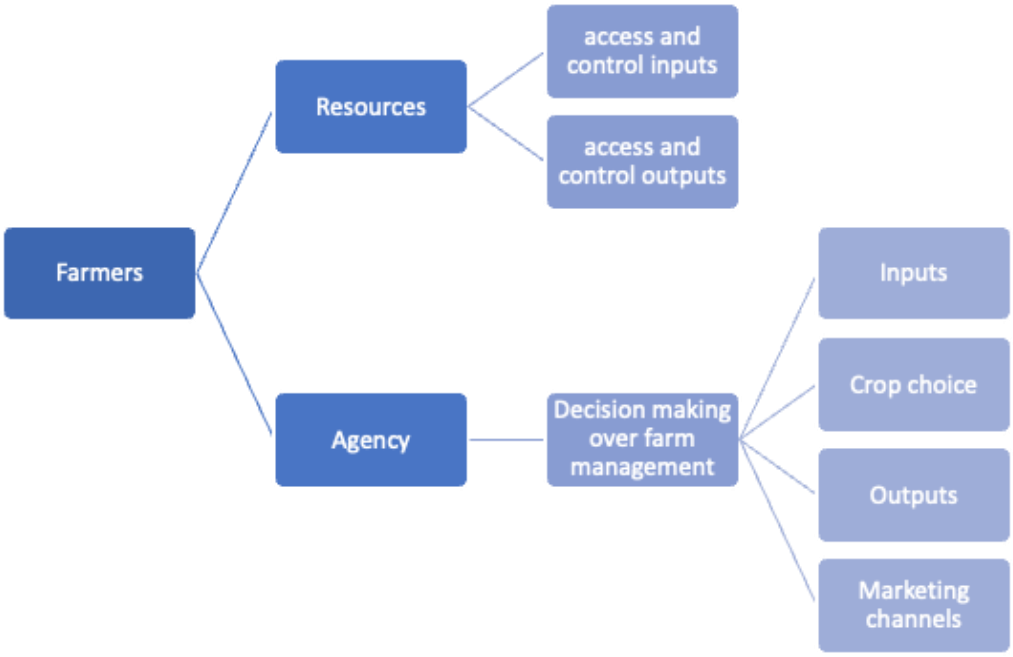
Figure 2: Kabeer's Empowerment Dimensions

Source: Kabeer, 1999. Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment.

To answer our research question, we adapt this framework and focus on two dimensions out of the three, namely resources and agency. These dimensions are essential to understanding and

addressing the challenges faced by women in the context of Uzbek women in agriculture, such as economic factors (farmers vs workers), emphasising the decision-making capabilities (within/and cultural challenges). For each group, we created further sub-dimensions, as presented in Figure 3 for farm managers and Figure 4 for workers.

Figure 3: Farmers' Dimensions of Employment

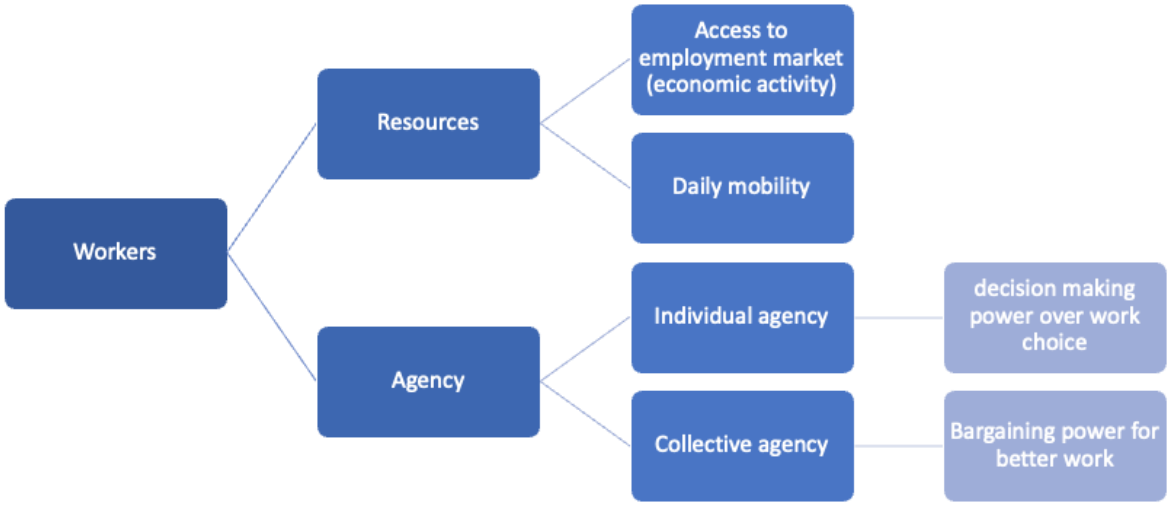


According to Kabeer's first dimension, resources are not only materialistic endowments but also include human and social factors that elevate the possibility of making choices. The author mentioned that local norms and regulations capture access to this kind of resource.

In measuring empowerment, we look at the potential inequalities between the two different agricultural systems (cotton and non-cotton) in the same provinces and on the capabilities of the two groups (farmers and workers) to exercise their choices. For female farm managers, empowerment in the first dimension involves gaining access to and control over inputs, assets, and outputs. However, remember that the control over farm resources, including inputs, also depends on the clusters/AIC quota system, representing a crucial difference from similar analyses of female farm managers in market economic systems ("Gender in Agriculture: Sourcebook," 2009; Kabeer, 2018).

The assumed opportunities for daily workers include access to farm and non-farm work and daily mobility. Rights to make decisions about working hours and mobility would expand female engagement in farm work opportunities and off-farm employment markets that contribute to higher household performance (Anderson et al., 2021; Gartaula et al., 2017).

Figure 4: Workers' Dimensions of Empowerment



Daily mobility, a socially constructed concept, varies across geography and time, influencing individuals, places, and entities. Explored in the literature for both urban and rural women, daily mobility serves diverse purposes, including economic opportunities, household responsibilities, education, and leisure activities (Bamberger et al., 1999; De Madariaga & Neuman, 2020; Masud Ahmed & Chowdhury, 2001; Peters, 2001; Uteng, 2011). Women have historically faced greater mobility constraints than men, reflecting and institutionalising gender inequalities in public spaces. Cultural expectations, economic factors, inadequate infrastructure and limited transportation contribute to gendered mobility patterns (Loukaitou-Sideris, 2020; Potgieter et al., 2006; Uteng, 2011; Wachs, 2010).

The transition from monoculture to horticulture, meaning new cropping patterns in the village, may influence the daily mobility pattern of workers, affecting their daily movements, skills, labour intensity, and earning sources. It may also motivate workers from cotton regions to travel to horticulture villages for better economic opportunities. In our analysis of this subdimension, we are prompted to investigate whether the transition from mono-culture to diverse crop systems empowers women by enhancing their daily mobility.

The second primary dimension is agency. This dimension of empowerment is found in a great deal of literature. For some authors, the concept of 'agency' describes the opportunity to set goals and act on them. Other scholars define agency as a meaningful choice (Alsop & Heinsohn, 2005; Elias et al., 2021; Meinzen-Dick et al., 2019; Sen, 1985). There is no consensus on how to measure this dimension. Agency can be performed by individuals or teams, leading to individual and collective agency. Individual agency refers to an individual's capacity to make choices and actions regarding their life, given personal autonomy and exercising one's will independently (Alsop et al., 2006; Sen, 1985). Meanwhile, collective agency refers to the capacity of collaborative actions emphasising team

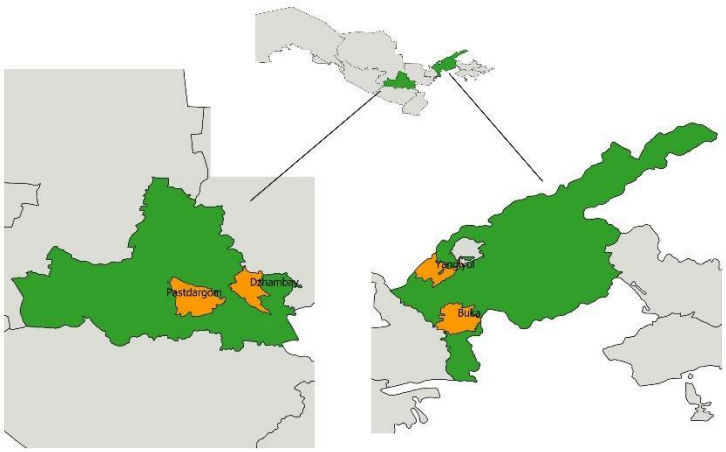
power dynamics, shared decision-making processes, and the ability of the team to achieve common goals (Cornwall & Rivas, 2015; Kabeer, 2005).

Therefore, we describe agency as the decision-making power, including bargaining power. Here, we define agency as the decision-making power of female farmers over farm management, like choosing inputs, output targets, type of crops to grow, and marketing channels. In the case of daily workers, the agency is defined as their freedom to choose between different kinds of farm work and to bargain for better working conditions (Pavanello et al., 2015). As mentioned above, workers' SOBs represent a form of collective agency.

4. Data and Method: from Conducting to Analysing

Our reason for targeting the farms in the selected districts is the fact that Jomboy (Samarkand province) and Yangiyo'l (Tashkent province) concentrate on cultivating vegetables, melons, fruits and vegetables, grapes, and other crops (Larson et al., 2015). Despite a short policy reversal during the 2018-2020 harvesting years, farmers in the Yangiyo'l district were authorised to grow vegetables again in 2021 (interview with an employee of the local AIC). Pastorgom (Samarkand) and Bo'ka (Tashkent) districts produce cotton and wheat. Both districts are close to our targeted horticulture districts and have a similar natural environment.

Map 1: The field of study



Source: Based on the GADM database of Global Administrative Areas (2021).

The field research for this study was approved by the *hokimiyats* of Tashkent and Samarkand provinces and supported by the National Research University TIIAME. In each district, we first visited the agricultural department of the local *hokimiyat* or AIC. The local administration tried to guide us in identifying female farmers. It was possible to interview from two to eight female farmers in each district.[5] Subsequently, these farm managers enabled us to find daily female workers. Despite of that, finding respondents proved to be a challenge, mainly due to unfavourable weather conditions

[5] Some interviews were not added to the analysis because the respondents' farm directions were not suitable for analysis as they were engaged in silkworm production.

and the reluctance of the local authorities (*hokimiyat)* to help, even though the corresponding author and principal researcher had a letter requesting help from the provincial administrations.

Following the empowerment measurement framework proposed in Section 3, we carefully crafted the interview questions. Following the qualitative research path described by Bengtsson (2016), our approach spans from strategic planning of data collection to comprehensive interpretation of findings. This structured methodology allows us to explore and understand the multifaceted impact of crop diversification on rural women's empowerment, utilising both the depth of qualitative analysis and analytical rigour across different socio-economic dimensions. The study included 40 respondents as it was complex to ensure a larger sample size. Qualitative research tends to prioritise depth over breadth, and a nuanced understanding is required of the available respondents.

In-person, in-depth interviews were conducted from September 2021 to December 2021. The interviews were semi-structured and lasted 20-70 minutes each. During the intensive field visits, respondents were asked about intrahousehold decision-making power, household conditions, household chores, women's time distribution, mobility possibilities, outcomes of horticulture cultivation, and well-being. Precisely, female farm managers were asked about the farm and farmers' characteristics, access to input resources, crop productivity, the decision-making power on the farm management, farm workers, agricultural assets, access to agricultural inputs and services, access to agricultural finance, challenges facing in farm management and participation in the agricultural value chain. Female daily workers were asked how to find work on and off the farm and their challenges in the labour market. Collectively, these drivers provide a solid foundation for comparative analysis.

Apart from the respondents, the corresponding author conducted four expert interviews in total. One interview with an AIC worker took place in each of Yangiyo'l and Jomboy districts, one interview with a university lecturer from Samarkand Agricultural Institute, and one expert from Tashkent Irrigation Institute. Experts mainly explained the horticulture system and how it functions in those districts, as well as aspects of land allocation and supply channels.

4.1. General Description of Data

Horticultural production has expanded due to a significant increase in productivity and the associated changes in the policy of distribution of cotton and non-cotton land (land optimisation). Since 2011, the Jomboy district (Samarkand) has been one of the districts in Uzbekistan where an increase in horticultural production took place. Therefore, this district was our first area for a field trip. Then, we visited Postdorgam (Samarkand), a pure cotton and wheat district. The third district was Bo'ka, a cotton-growing district in Tashkent province, and the last district was Yangiyo'l a horticultural district in Tashkent province. In each district, we interviewed farmers first and, later, workers.

Table 2: Characteristics of farmers and workers

	Cotton farmers (10 respondents)	**Horticulture farmers (11 respondents)**	**Workers from cotton districts (9 respondents)**	**Workers from horticulture districts (10 respondents)**
Districts	Bo'ka (Tashkent) Pastorgom (Samarkand)	Yangiyo'l (Tashkent) Jomboy (Samarkand)	Bo'ka (Tashkent) Pastorgom (Samarkand)	Yangiyo'l (Tashkent) Jomboy (Samarkand)
Age	44-62	45-67	28-62	32-65
Educational degree, (number)	University Degree (5) Vocational school degree (3) High school (2)	University Degree (4) Vocational school degree (6) High school degree (1)	Vocational school degree (4) High school degree (5)	University degree (1) Vocational school degree (2) High school degree (7)
Number of children	2-3	2-3	2-3	1-4
Availability of *tomorka*	Yes	Yes	Yes	Yes
Availability of animal in HH	Yes	Yes	No or poultry	Yes
Availability of car	Yes (themselves or husband/son uses)	Yes (themselves or husband/son uses)	No	No/Yes (Husband/Son uses)
Can drive a car	Yes/No	Yes/No	No	No
Household chores	Daughter-in-law/herself	Daughter-in-law/herself	Herself/ unmarried daughters	Herself/ unmarried daughters/ daughter-in-law
Head of households	Themselves or husband	Themselves or husband	Husband or parents in law	Husband or parents-in-law
Lives with	Husband, son, daughter-in-law and grandchildren or so(s), daughter-in-law and grandchildren	Husband, son, daughter-in-law and grandchildren or son(s), daughter-in-law and grandchildren	Husband and children or Parents-in-law, husband and children	Husband and children (grandchildren)
Household related decision making	Farmer herself or farmer herself together with husband	Farmer herself or farmer herself together with husband	Husband/ Parents-in-law	Husband/ Parents-in-law

Source: Authors' calculations

Farmers' ages varied between 44 and 67 years. Meanwhile, workers could be much younger, starting from 28. Nine farmers out of 21 have a university degree, but only one worker out of 19 has a university level of education. Every household has a *tomorka*, a garden plot either attached to or near the house. Crops cultivated in the *tomorka* are mainly used for household consumption. All farmers raise some animals: either sheep, cows or poultry. Not every farmer knows how to drive a

car: just four out of 21 farmers can drive themselves. Nevertheless, almost every farmer's household has a personal vehicle used by a male family member. At the same time, most workers' families do not have personal vehicles.

5. Results: Cotton vs Horticulture

Dimension 1: Resources

1.1. Farmers

Land leasing rights are the same for horticulture and cotton-wheat farmers. The land size varies in cotton and horticulture districts; horticulture fields are likely to be much smaller than cotton fields. From the interviews, we found that the average cotton farm's land allocation for cotton and wheat production can be fifty-fifty or 60 percent versus 40 percent, depending on the contract. However, each horticultural area may have a different distribution of land. In Jomboy, 40 percent of the land should be allocated to wheat production, while in Yangiyo'l district, the proportion is 30 percent, and the remaining land belongs to horticulture or gardening.

Table 3: Farmers' farm characteristics

	Bo'ka (Tashkent) (8 respondents)	**Pastorgom (Samarkand) (2 respondents)**	**Yangiyo'l (Tashkent) (4 respondents)**	**Jomboy (Samarkand) (7 respondents)**
Farm type	Cotton and wheat	Cotton and wheat	Gardening; Vegetable and wheat	Vegetable and wheat
Farm size	57-102	70-106 ha	14-101	14-40
Land share	35% wheat & 65% cotton or 50% wheat – 50% cotton (Depends on the AIC contract)	60% wheat – 40% cotton (Depends on the AIC contract)	70% – 90% fruits; Or 30% wheat – 70% horticulture and gardening	40% wheat – 60% horticulture (Depends on the AIC contract and cluster contracts)
Sharecropping	With permanent workers	With permanent workers	No, or if wheat production, then with permanent workers	With permanent workers; Fellow villagers
2nd crop	Vegetables & beans	Vegetables & beans	Vegetables	Beans
Outcome	Cotton and Wheat clusters	Cotton clusters; wheat processing plant	Clusters or market	Clusters or market
Input	Partly form Clusters; Subsidised credits; Market	Partly form Clusters; AIC; Subsidised credits; Market	Clusters or market	Clusters or market
Permanent workers	14-30	15	3-10	3-10

Payment system of permanent workers	Sharecropping + overproduced wheat	Sharecropping + overproduced wheat + monetary	Sharecropping + overproduced wheat/horticulture + monetary	Sharecropping + overproduced wheat/horticulture + monetary
Daily workers	30-80 (only for cotton harvesting season)	15 (only for cotton harvesting season)	10-40	10-40
Work with SOBs	No	No/yes	Yes	Yes

Source: Authors' calculations

Access to labour resources is also the same, but the number of workers may vary. Permanent workers in all farmland are male, whom farmers employ throughout the year. They can be, for instance, responsible for irrigation or tractor drivers. The payment system between permanent workers and farmers is arranged in advance. Usually, the payment is in some form of in-kind. Often, sublet land is used as payment, and the wheat or other agricultural produce harvested goes to compensate permanent workers; only some farmers mentioned that in addition to this, they pay a certain amount of money each month to their permanent workers. Also, both types of farmers have total access and control over the machinery and decide to purchase or sell it together with their husbands or older sons.

1.1.a. Subsidies Inputs, Access, and Control to Inputs

If we consider the first dimension, farmers in both types of villages do not enjoy equal access to resources. The clusters (if existing in the district) or local administrations sign a contract with farmers at the beginning of the year for a concrete delivery plan for cotton, wheat or horticulture. Hence, in exchange, farmers from cotton and wheat regions receive subsidised inputs from AIC or cotton/wheat clusters for agricultural production.

"… If we use the fertiliser they (local administrations) provided, we can make that amount of plan. They provide us with the input only according to the plan (she wants to say that there is more potential but a lack of input). If you want to receive more harvest, you can spend more money and buy (necessary) inputs. If you use (that input) and use it (properly) and pay for workers, you can make an extra harvest (at the same field) … If we spend (extra) money (on inputs), we have (want) to use the harvest (ourselves), too" (Boka, Farmer 4).

Cotton clusters continue to provide subsidies for cotton production (as they did in previous years). The respondents reported that farmers usually receive seed, fertiliser, and, if necessary, machinery, extra monetary support to pay daily workers during harvest, credits without collateral and with a low-interest rate (for 2021, it was around five percent). That is why those farmers do not receive extra credits from banks.

This is different for horticulture farmers: They receive subsidised inputs necessary for wheat production, which is also part of the land allocation decree. However, they do not have subsidised inputs for vegetable production. The government would only give them subsidies for adopting drip

irrigation technology. Apart from that, farmers have to buy inputs from the market at the market price. If these farmers want to receive credits, they need to show collateral, and the interest rate would be much higher, around 14 percent.

In the comparison of cotton and horticulture farmers, we clearly see that cotton farmers enjoy an advantage in terms of access to government resources. However, being asked if they could finance their crop production for the next year without any subsidies and support for the profits from the current harvest, they all said it was impossible. Horticulture farmers reacted more positively, as they are less financially constrained. One reason is the lower indebtedness because they are afraid to get loans from banks with high interest rates and collateral. If they need financial support, these farmers would ask for loans from their extended family rather than official financial institutions.

1.1.b. No Aggressive Quota That Leads to Better Land Tenure

Farmers in both types of villages, due to the crop allocation program, receive a quota for crop production. For cotton farmers, the quota always comes from cotton clusters that have monopsony over cotton production. The cotton quota is given in tons of production per hectare. This quota is defined based on the last year's quota. There might be additional factors, such as the quality of the soil and water access. Because cotton is already a traditional crop and has been cultivated for generations, the clusters (prior government) would like to get the highest yield possible.

"…If a farmer cannot reach the quota, 60 percent (the local government) takes the land from (the farmers) … for example, if a farmer has 100 tonnes of the plan and cannot fulfil at least 60 percent, then the local hokim (mayor) will take the land from that farmer... (Also), during land optimisation (local government) takes away the land from farmers who cannot fulfil the plan..." (Bo'ka, Farmer 5).

Farmers who are unable to fulfil the quota risk losing their land (even though farmers have had land usage rights for 49 years). Alternatively, a farmer has to take huge loans to cover the potential loss in cotton yield by external purchases. The quota issue is very challenging for the farmers, and farmers are not too motivated to invest in the land due to poor land tenure. Similarly, some respondents were bragging about easily closing the quota this year, and some were worried about it.

Regarding horticulture, neither the horticulture cluster nor AIC is strict with the horticulture quota, and all farmers could easily fulfil it. The decision on the horticulture quota's amount remained somewhat opaque, but it became clear that it has been driven by the processing plant's needs. Furthermore, as horticulture crops can change from one year to another, the quota might also change. The fulfilment of the quota made farmers satisfied with themselves, and these farmers were not scared to lose their land. Hence, they invested more in their farm (such as buying new vehicles or water pumps).

1.2. Workers

In the first dimension, the situation of daily workers is strikingly different between cotton and horticulture districts. Every crop demands a different type of labour.

Table 4: Daily workers' work system

	Bo'ka (Tashkent) (6 respondents)	**Pastorgom (Samarkand) (3 respondents)**	**Yangiyo'l (Tashkent) (4 respondents)**	**Jomboy (Samarkand) (6 respondents)**
Member of the SOB	No (Works with neighbours or friends)	No (Works with neighbours or friends)	Yes	Yes
Working months	Cotton harvesting season	Any crop season	Horticulture + cotton harvesting season	Horticulture + cotton harvesting season Or only horticulture from one's own village
Payment system	Monetary daily based	Monetary daily based	Monetary daily based; Benefit leftover crops from the field	Monetary daily based; Benefit leftover crops from the field
Off-farm labour	Trading in the local bazaar	Trading at the local bazaar	No	No, or trades at the local bazaar

Source: Authors' calculations

1.2.a. Employment Opportunity: Economic Activity All Around the Year

There is a significant difference between women employed in horticulture and cotton farming, primarily due to the duration of farm work in the former case. In cotton areas, except for those who are the wife, sister or daughter of a permanent farm worker, the period of full-time employment is limited to 1.5-2 months per year. Those related to the permanent workers do extra work in April, mainly removing weeds from the cotton plantation. During the remaining months, these workers face a shortage of farm and non-farm employment opportunities in the villages, forcing rural women to seek work in neighbouring villages or towns.

Survey respondents indicated prospects for non-agricultural work, including positions in textile factories, ateliers, and local bazaars. However, women still find it challenging to find such jobs. One respondent from Bo'ka (a cotton production village emphasised that:

"*There are no jobs for women here. Many women go to the bazaar (as a trader). There are some women who work in textile (factory). There are some enterprise (firma) works, weeding, picking up the cotton*" (Bo'ka, Worker 2).

Nevertheless, women with vocational or higher education can find jobs as teachers, nurses, and accountants in important organisations. However, the female workers interviewed have an average secondary education, which makes them unsuitable for such positions. Hence, if they are satisfied with the working conditions in textile factories or ateliers, they may choose such jobs. Nevertheless, dissatisfaction with conditions, working hours and wages often make them prefer day labour on the farm.

"*There is tailoring (textile ateliers). Not in our neighbourhood (mahalla) anymore, because our neighbourhood is small and narrow (dar). They (women in our village) go to distant places to sew*

and weave. Then, there are chicken factories and beverage factories. They work in these places. I no longer wanted to work in those places" (Yangiyo'l, Worker 4).

In contrast, in horticultural districts, employment opportunities cover 8-9 months of the year. Consequently, women in horticultural areas are less concerned about finding alternative work in or outside the village. This difference in the duration of employment highlights the significant differences between the labour experiences of cotton and horticulture workers.

1.2.b. Daily Mobility: Expanding and Refining Geographical Mobility Among Rural Women

We found that geographic mobility, particularly daily mobility, is markedly limited for rural women, primarily due to two key factors. First, entrenched negative cultural stereotypes perpetuate restrictions on women's mobility imposed by husbands, in-laws, or parents. This restrictive environment prevents women from seeking better employment opportunities in neighbouring villages or towns. Also, despite having a certain level of education, some workers in this context face a complete lack of employment opportunities. Therefore, these women rely on daily labour for financial support. The problem is worsened as many husbands only allow their wives to seek employment in their village. The rigid cultural negative stereotypes prevalent in these communities are ultimately the main cause of the economic hardship and poverty faced by these families.

Second, inadequate rural infrastructure, characterised by poor roads, is a major obstacle. It is difficult for women to travel independently to remote settlements because bus and taxi drivers are afraid of damaging vehicles. One respondent described it in such a way: "…*the roads are really bad. If there is rain, the roads become very muddy and watery. It is difficult to get somewhere. Every day, we should do laundry. Every day, we do laundry, dry it on the heater and make it dry until the morning. That is why working clothes are paired, today first one, tomorrow second pair*" (Boka Worker 4).

"*The road is the problem of bigger people (infrastructure). Everyone would be glad (for better roads). Isn't it? Everyone wants the roads to be good. (We want that) whenever our children go to school or to kindergarten, they come home without muddy shoes/clothes. We can manage hot and cold water. The roads are the main thing, but it's still bad. The middle (the middle of big roads, highways which were cut from the middle, the roads are bad, only used parts are more or less acceptable for driving a car)*" (Bo'ka, Worker 5).

Poor infrastructure seems to disempower women in those districts and increase the amount of unpaid labour in the house. Also, it is essential to recognise that women with mobility are often critical to the livelihoods of their households, especially in cotton villages. These women, out of economic necessity, engage in additional activities, such as trading or seeking employment in other villages or towns.

The introduction of horticulture becomes a potential solution, allowing women with limited geographical mobility to contribute economically by staying in their villages for long periods. However, this raises the paradoxical question of whether the horticulture sector promotes economic activity but unwittingly keeps women tied to village life. Similar patterns may emerge in the case of

cotton areas transitioning to horticulture, which will require further investigation in future research. In such cases, while the horticulture sector expands women's economic opportunities, it may simultaneously constrain daily mobility.

In addition, complex social intra-family dynamics affect accessibility, control and ownership of mobility facilities. Understanding these dynamics is necessary to understand the multifaceted nature of female mobility in rural areas. For example, our results also show that none of the female workers know how to drive a car or own such a vehicle.

Due to the lack of employment opportunities in cotton districts, we conclude that women have to find another economic activity, which might be in other villages or towns, requiring women to have daily mobility. But it's tricky because of household dynamics: husbands (or parents, parents-in-law) might any time restrict them from travelling somewhere, and with the transition to horticulture, women have economic activity for more extended periods, but they might be chained to their villages. Respondents explain it as: "... in Uzbeks (the law) what husband says ..." (Pastorgom, Worker 1).

Dimension 2 - Agency

2.1. Farmers

2.1.a. Decision-Making Over Inputs

Since the advent of the cluster system in Uzbekistan, all farmers have the freedom to decide on other inputs. During interviews, farmers reported that if farmers contracted with clusters and considered it necessary to buy inputs from the market rather than from the clusters, they were entitled to do so (as when cotton was under state control, farmers were obliged to buy these inputs from the state at a subsidised price). However, the *partial liberalisation* of the cotton sector allowed farmers to decide on more issues individually.

2.1.b. Crop Choice Freedom at A Small Level

Looking at the general decision-making processes for farm management, we can see that horticultural producers have more power over farm management in this dimension. Due to the land allocation program, farmers are expected to cultivate 100 percent of their irrigated lands. As an expert from Yangiyo'l explained: At the end of land allocation, horticulture farmers have 10 percent of land left for their own crop choice without any contracts from AIC or clusters. Also, in both cases, farmers are free to choose the crops on the second crop after harvesting the wheat. However, if the AIC decides that the land should rest after the wheat harvest, or if the AIC orders that farmers plant some horticultural crops, farmers will lose their freedom of crop choice of the second crop for the year. Considering that half of the land is already ordered with wheat and a third with called vegetables contracted by the AIC/cluster, horticulture farmers have at least ten percent of the land with the freedom to choose crops, besides having complete the freedom for a second crop after the wheat harvest.

2.1.c. Better Choice of Supply Channel

From export interviews, we understand that the horticulture districts have several vegetable clusters, where farmers can make agreements at the beginning of the harvesting year with any cluster they want to; Yangiyo'l had 11 vegetable clusters and two wheat clusters. However, it was not the same for Jomboy and Yangiyo'l. For cotton, there is only one cluster in each district. Farmers cannot sign a cotton production contract with other district clusters even though the other might have reasonable output prices.

"..We heard that the neighbouring district has good prices and we signed contracts with them, because in the beginning they (local administration) said that we can do it. However, in short period, our local cluster forced us to work with them, even though we did not want it because they pay less per kilogram of cotton. And local administration forced, too…" (Bo'ka, Farmer 3).

2.1.d Freedom on Over Surplus Crops

Horticultural farmers can decide about the market supply channel and the products they produce. These farmers can quickly sell their crops and surplus crops under contract; they can sell at a market price. Cotton farmers complained whenever they had surplus wheat, and if someone from the district could not meet the plan, they had to sell their grain at the state price to help meet the district plan. After the cotton plan is fulfilled, the surplus production is also *"forced"* to be sold at a cluster price, which may be below the market price.

Similarly, this leads to poor land tenure in these areas, as farmers expect to lose their land or debts if they fail to meet the plan or quota, and they are afraid to invest more in their land as they may lose the land. One cotton farmer stated that their soils are of poor quality because they have to grow only wheat and cotton, and horticulture farmers have higher yields and better-quality soils. That is why, even if a horticultural farmer agrees with an AIC or cluster/processor to sell produce, the farmer has no fear of losing the land.

2.2. Workers

2.2.a. Empowerment Through Work Choice

The horticulture sector has a unique advantage in terms of job choice. Since available jobs are almost year-round, horticulture workers can choose the type of on-farm work that fits their household needs. This freedom is especially valuable when urgent financial needs arise, as workers can choose immediate work.

"... This, our income, is a benefit for us. For example, if we work daily during the week, we can go and get what we need from the market, whatever we want… we can choose it… and our village is also developing. Conditions are good" (Jomboy, Worker 6).

Also, if the farmer had a poor reputation among the workers in the past, then workers would not go to work for this specific farmer anymore. The availability of choice also empowers workers in the horticulture sector. Meanwhile, cotton workers did not have such a luxury.

2.2.b. Socialising and Collective Agency Within SOB

Analysing the decision-making process of workers, the organisation of brigades provides exciting aspects. Self-organised brigades (SOB) are informal groups of women who gather and work together. One woman heads this brigade and communicates and negotiates with the farmers. ILO (2017) reports that the brigades first appeared in 2010 in some districts. These groups are known for effective performance, so SOBs can be selective regarding the farmers they work for and their earnings (ILO, 2017).

Every 10-15 women in the same neighbourhood or friendship group create one brigade. These workers have some degree of freedom of time because they can decide whether to go to work. The head of brigades and workers have their own way of communicating labour information. In Jomboy, there are several SOBs. Particularly, friends in similar age groups become members of one brigade. Whenever a farmer needs workers, the farmer knows who is precisely the head of this brigade. In Jomboy, some brigades practice that the brigade's charge receives the wage payment and distributes it among the workers herself at the end of the day or season.

"I am a brigadier myself. 11 to 15 to 20 people work for me. I am the one who collects workers and gives them money. For example, if I ask five people, I will call five people. If a farmer needs help, I will say to them that the farmer will be helped. I am a job seeker, a job guide. I tell these people, for example, if there are half a hectare of beans, I tell them to collect. They will do it, or if the corn needs to be turned, it will turn. That's our job. I'll take the money from the farmer. The other person gives to workers" (Jomboy, Worker 4).

Participation in such brigades empowers female workers, giving them the power to demand better working conditions from farmers and to overcome information asymmetries in the labour market. Because the head brings a high number of workers at once, she can bargain the earnings, and the unity of SOBs bring better bargaining power over the farm work. The same bargaining power is not possible for cotton workers. Because during cotton harvesting season, earnings are decided according to the harvested kilogram of cotton. And it's usually fixed among all farmers. Even though cotton workers choose which farmer they want to go to, the earnings will be the same at the end of the day.

" … (farmer) and the head of the brigade negotiate over this 1 ha of land for 600k UZS, and 7-8 people work there. The amount is enough for all workers. Workers split 600k UZS among themselves. After receiving the shared money, we go home" (Jomboy, Worker 5).

However, brigades could also serve an exclusionary function. All workers reported needing help finding horticulture work whenever they were alone and not part of SOBs.

"*I like to be a member (of a brigade). Because there is work every day, if I am alone (not being a member of a brigade), I won't be able to find work even for three days*" (Yangiyo'l, Worker 4).

Many farmers who have engaged in horticulture production, even in cotton districts during the second crop period, prefer to work with SOB. There are also SOBs in cotton villages, but they are less

cohesive than in horticultural villages. Brigades in horticulture have been more viable because the cotton seasons are known, and the day labourers know roughly which farmer is growing cotton, but horticulture working days can differ. Nevertheless, it would be wrong to conclude that these workers cannot bargain for better conditions. Some cotton farmers pointed out that if they cannot meet the cotton harvest plan on time and if it is the third harvest period where petite cotton remains in the field, farmers try to provide transportation and food for the workers. In that way, daily workers will be compensated for potentially lower payments. Due to natural conditions, workers can harvest up to 120-130 kilograms of cotton in the first harvest period. This amount declines substantially in follow-up rounds of harvest. In the best scenario, they can harvest up to 60 kilograms in the third harvest period. In addition, the weather conditions are less favourable, as it may be early November. Therefore, workers do not prefer later harvest rounds, and farmers face difficulties finding workers.

Conclusion

This research contributes new evidence on the various positive impacts of the transition to horticulture on rural women in Uzbekistan. Using insights from qualitative interviews with female farm managers and daily workers in four Uzbek districts, we contrast the socio-economic situation and experiences of roughly 40 women. We describe several differences in tasks and activities based on a comparison of the two dimensions of empowerment, namely resources and agency across cotton and horticultural districts.

The differences between cotton-growing and horticultural areas involve differential access to resources and choices. These differences are due to policies that directly or indirectly grant or restrict access. First, clusters have a stronger monopsony position in the cotton chain than horticulture, as farmers are not limited to only one crop. This carries on to seasonal workers, who enjoy a more extended phase of employment in horticulture compared to cotton. Furthermore, marketing above-quota quantities is much more limited for cotton than horticulture.

In our conceptual framework's first dimension, which focuses on resources (such as control and access to resources, inputs, outputs, and assets for farmers), the cluster/Agro-Industrial Complex contract contributes to the differences across farm types. Although cotton farmers benefit from subsidised inputs, they face greater land security challenges in case the quota cannot be fulfilled. Horticultural farmers do not face similar land insecurity but do not receive subsidised inputs or subsidised credits. In the second dimension—agency—our research reveals that horticultural farmers possess a higher degree of empowerment. They demonstrate the capacity to make decisions regarding selecting crops, inputs, and marketing channels for vegetable products. In contrast, cotton producers do not have that privilege. Due to some level of flexibility in the choice of crops, farmers can have good production that yields high incomes.

Comparing the seasonal female workers, our results show evidence of extended employment spells in horticulture villages. Also, women with limited geographical mobility benefit from the diverse range of available agricultural jobs and economic activities in horticultural villages. However, in the absence of self-organised brigades (SOB), these workers remain uninformed about the location and nature of available work opportunities. Meanwhile, workers in the cotton regions possess precise

information about the designated farmers for harvesting cotton, and they do not need such brigades to find farm work. Hence, due to work-related information flow, these SOBs are usually more unified in the horticultural villages, where they can be free from the information asymmetry associated with farm jobs. Such cohesion also provides negotiating power for better working conditions, where workers can exercise agency. Workers in horticultural areas can work up to eight months a year (some respondents who are themselves the head of SOBs can find farm work all around the year), while workers in cotton areas do not have as much choice in farm work and can work up to 1.5 months.

Caution should be exercised when considering daily mobility, especially in the context of the transition to other crops, such as horticulture. The transition to horticulture may limit women's daily mobility, especially in situations where it is not usually necessary to travel outside the village for household activities. This limitation may have a significant impact on the expansion of mobility opportunities depending on the dynamics within the household. In addition, these results can also inform debates, especially with regard to rural infrastructure development. It is critical for the Uzbek government to take these considerations into account when designing rural development plans so that they are not unintentionally gender-blind. Active planning measures can contribute to the development of gender-inclusive policies that recognise and address the nuanced impact of economic activities such as horticulture on women's daily mobility and empowerment.

Finally, in the comparative analysis between horticulture farmers and workers, it becomes evident that, through the transition to horticulture, female farm managers experience more benefits than workers. A primary contributing factor is that farmers inherently possess a degree of managerial authority over the farm and access to agricultural inputs, a privilege not extended to workers. In contrast, workers do not have the same power. It appears from farmer interviews that, despite higher costs, vegetable gardening brings higher revenues and returns in comparison to wheat and cotton.

Given that only a few women manage farms, their contributions are often overlooked, although they play a key role in agriculture. Empowering women to fight poverty is a key policy initiative in a number of developing countries. Recognising this importance, Uzbekistan has begun to highlight women farmers' role in 2019 by celebrating the "International Day of Rural Women" every October. However, at the policy level, progress has been gradual: a comprehensive gender perspective is still lacking in many agricultural policies.

From this comparison, we see many positive aspects of horticultural production. This is how the Uzbek government can indirectly empower rural Uzbek women. Therefore, further liberalisation of agriculture, for example, granting farmers freedom of general farm management such as freedom on the decision of crop choice, limiting the quota system, freedom on marketing channels choice, and securing land tenure, could have positive consequences for all rural households and motivate female population also engage in farming. However, the monopsony of clusters and state land allocation programs first stopped the further liberalisation of the cotton/horticulture sector. In

addition, the opinions and demands of women could be included in policies, agendas, or projects on topics such as farm management.

Uzbek government could create off-farm employment opportunities for the rural population, diversifying not only crop production but also the rural economy itself and opening up opportunities for access to training that provides skills relevant to local labour market needs. In addition, a more diversified rural labour market would address the persistence of large-scale informal employment in the farming sector. Rural infrastructure and excellent roads will benefit women and the entire rural population.

This study explores the world of rural women in Uzbekistan, specifically female daily workers and female farmers within different institutional contexts. The study's contribution is to address gaps in the comprehensive understanding of the effects of crop diversification on female farmers and labourers. The significance of this study is that it reveals the lack of broad information on these topics and gender dynamics in the Central Asian context, serves as a valuable resource for the wider academic community and policymakers, and highlights the need for more research in these areas to understand the gender situation in Central Asia. This, in turn, can help develop more nuanced policies and interventions to address the unique challenges rural women face in Uzbekistan.

While recognising our study's contribution, we also acknowledge its limitations. Firstly, we look only at four districts located in the main province of Uzbekistan. Any generalisation to other provinces is impossible. Expanding the scope of the study to cover a wider geographical range and using a quantitative survey would undoubtedly increase the study's comprehensiveness and a statistical test of the observed differences. Also, comparative studies with other Central Asian countries would shed light on the differences and similarities in crop diversification's effects.

Bibliography:

Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A. R., Seymour, G., & Vaz, A. (2013). The Women's Empowerment in Agriculture Index. In *OPHI Working Paper* (58). https://www.ophi.org.uk/wp-content/uploads/ophi-wp-58.pdf

Alsop, R., Bertelsen, M., & Holland, J. (2006). *Empowerment in Practice*. he International Bank for Reconstruction and Development/THE WORLD BANK. https://libproxy.tuni.fi/login?url=https://search.proquest.com/docview/1621828328?accountid=14242%0Ahttp://sfx.nelliportaali.fi/nelli34b/?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=article&sid=ProQ:ProQ%3Asocscijournals&atitle=In+P

Alsop, R., & Heinsohn, N. (2005). Measuring empowerment in practice: Structuring analysis and framing indicators. *World Bank Policy Research Working Paper 3510*, *February*, 123. https://doi.org/10.1037/e596892012-001

Anderson, C. L., Reynolds, T. W., Biscaye, P., Patwardhan, V., & Schmidt, C. (2021). Economic Benefits of Empowering Women in Agriculture: Assumptions and Evidence. *Journal of Development Studies*, *57*(2), 193–208. https://doi.org/10.1080/00220388.2020.1769071

Babadjanov, J., & Petrick, M. (2023). Uzbekistan's cotton clusters in the context of the industrial policy debate. *Eurasian Geography and Economics*. https://doi.org/10.1080/15387216.2023.2267093

Bamberger, M., Lebo, J., Gwilliam, K., & Gannon, C. (1999). *Gender and Transport: A rationale for action*. https://openknowledge.worldbank.org/entities/publication/7587012e-2cdd-5e68-b6a7-05889a921044

Bobojonov, I., Lamers, J. P. A., Bekchanov, M., Djanibekov, N., Franz-Vasdeki, J., Ruzimov, J., & Martius, C. (2013). Options and constraints for crop diversification: A case study in sustainable agriculture in Uzbekistan. *Agroecology and Sustainable Food Systems*, *37*(7), 788–811. https://doi.org/10.1080/21683565.2013.775539

Cagatay, N. (2001). *Trade, Gender, and Poverty* (Issue January 2001). https://www.researchgate.net/publication/49464683_Trade_Gender_and_Poverty

Cornwall, A., & Rivas, A. M. (2015). From 'Gender Equality and "Women's Empowerment" to Global Justice: Reclaiming a Transformative Agenda for Gender and Development. *Third World Quarterly*, *36*(2), 396–415. https://doi.org/10.1080/01436597.2015.1013341

Csaki, C., Kray, H., & Zorya, S. (2006). *The Agrarian Economies of Central-Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2005* (Issue Working Paper No.46).

De Madariaga, I. S., & Neuman, M. (2020). Engendering cities: Designing sustainable urban spaces for all. In *Engendering Cities: Designing Sustainable Urban Spaces for All*. Taylor \& Francis. https://doi.org/10.4324/9781351200912

Deshmukh-Ranadive, J. (2005). *Measuring Empowerment: A Gender Analysis of Household and Family Dynamics*. Centre for Women's Development Studies. https://books.google.de/books?id=dS3aAAAAMAAJ

Dolan, C. S., & Sorby, K. (2003). Gender and employment in high-value agriculture industries. In *Agricultural and Rural Development Working Paper* (No. 26393; Vol. 7). http://rmportal.net/library/II/C/2/multi0page-2.pdf

Elias, M., Cole, S. M., Quisumbing, A., Maria, A., Valencia, P., Meinzen-dick, R., & Twyman, J. (2021). Assessing women's empowerment in agricultural research. In R. Pyburn & A. van Eerdewijk

(Eds.), *Advancing gender equality through agricultural and environmental research: Past, present, and future* (pp. 329–362). International Food Policy Research Institute (IFPRI). https://doi.org/https://doi.org/10.2499/9780896293915_09

Emana, B., Afari-Sefa, V., Dinssa, F. F., Ayana, A., Balemi, T., & Temesgen, M. (2015). Characterization and assessment of vegetable production and marketing systems in the humid tropics of Ethiopia. *Quarterly Journal of International Agriculture*, *54*(2), 163–187.

FAO. (2019). *Gender, Agriculture and Rural Development in Uzbekistan. Country Gender Assessment Series*. http://www.fao.org/3/ca4628en/ca4628en.pdf

Feliciano, D. (2019). A review of the contribution of crop diversification to Sustainable Development Goal 1 "No poverty" in different world regions. *Sustainable Development*, *27*(4), 795–808. https://doi.org/10.1002/sd.1923

Gartaula, H., Patel, K., Johnson, D., Devkota, R., Khadka, K., & Chaudhary, P. (2017). From food security to food wellbeing: examining food security through the lens of food wellbeing in Nepal's rapidly changing agrarian landscape. *Agriculture and Human Values*, *34*(3), 573–589. https://doi.org/10.1007/s10460-016-9740-1

Gender in Agriculture: Sourcebook. (2009). In *Agriculture and Rural Development*. The International Bank for Reconstruction and Development/The World Bank. https://doi.org/https://doi.org/10.1596/978-0-8213-7587-7

Gupta, R. P., & Tewari, S. K. (1985). Factors Affecting Crop Diversificaiton: An Empirical Analysis. *Indian Journal of Agricultural Economics*, *XL*(3), 304–309.

ILO. (2017). *Recruitment practices and seasonal employment in agriculture in Uzbekistan 2014-15*. https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipec/documents/publication/wcms_561537.pdf

Kabeer, N. (1999). Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment. *Development and Change*, *30*(May), 435–464.

Kabeer, N. (2005). Gender Equality and Women's Empowerment: A Critical Analysis of the Third Millennium Development Goal. *Gender and Development*, *13*(October), 13–24. https://www.jstor.org/stable/20053132

Kabeer, N. (2018). Gender, Livelihood Capabilities and Women's Economic Empowerment: Reviewing Evidence Over the Life Course. In *Gender and Adolescence: Global Evidence (GAGE)* (Issue September). https://www.gage.odi.org/publication/gender-livelihood-capabilities/

Kandiyoti, D. (2002). Agrarian reform, gender and land rights in Uzbekistan. In *Social Policy and Development Paper - United Nations Research Institute for Social Development* (Issue No.11).

Kerr, R. B., Snapp, S., Chirwa, M., Shumba, L., & Msachi, R. (2007). Participatory Research On Legume Diversification With Malawian Smallholder Farmers For Improved Human Nutrition and Soil Fertility. *Experimental Agriculture*, *43*(4), 437–453. https://doi.org/10.1017/S0014479707005339

Larson, D. F., Khidirov, D., & Ramniceanu, I. (2015). *Uzbekistan Strengthening the Horticulture Value Chain* (94281). https://openknowledge.worldbank.org/handle/10986/21495

Lerman, Z. (2008). *Agricultural Development in Uzbekistan: The Effect of Ongoing Reforms* (Issue Discussion paper No. 7.08).

Lerman, Z. (2021). Gender gaps in Central Asia: A reassessment. *Central Asian Journal of Water Research*, *7*(2), 47–73. https://doi.org/10.29258/cajwr/2021-r1.v7-2/47-73.eng

Loukaitou-Sideris, A. (2020). A gendered view of mobility and transport: Next steps and future

directions. In *Engendering Cities: Designing Sustainable Urban Spaces for All* (p. 19). Taylor & Francis. https://doi.org/10.3828/tpr.2016.38

Makate, C., Wang, R., Makate, M., & Mango, N. (2016). Crop diversification and livelihoods of smallholder farmers in Zimbabwe: Adaptive management for environmental change. *SpringerPlus*, *5*(1135), 18. https://doi.org/10.1186/s40064-016-2802-4

Malapit, H., Quisumbing, A., Meinzen-Dick, R., Seymour, G., Martinez, E. M., Heckert, J., Rubin, D., Vaz, A., Yount, K. M., & Team, and the G. A. A. project P. 2 (GAAP2) S. (2019). Development of the project-level Women's Empowerment in Agriculture Index (pro-WEAI). *World Development*, *122*, 675–692. https://doi.org/10.1016/j.worlddev.2019.06.018

Malhotra, A., & Schuler, S. R. (2005). Women's empowerment as a variable in International Development. In D. Narayan (Ed.), *World Bank.org* (pp. 71–88). http://books.google.com/books?hl=en&lr=&id=BzXyApyTGOYC&pgis=1

Masud Ahmed, S., & Chowdhury, M. (2001). Micro-Credit and Emotional Well-Being: Experience of Poor Rural Women from Matlab, Bangladesh. *World Development*, *29*(11), 1957–1966. www.elsevier.com/locate/worlddev

Meinzen-Dick, R., Rubin, D., Elias, M., Mulema, A. A., & Myers, E. (2019). Women's Empowerment in Agriculture: Lessons from Qualitative Research. In *IFPRI Discussion Paper* (Vol. 1797). https://doi.org/10.1080/13549839.2019.1703663

Najjar, D., Devkota, R., & Feldman, S. (2022). Feminization, rural transformation, and wheat systems in post-soviet Uzbekistan. *Journal of Rural Studies*, *92*(April), 143–153. https://doi.org/10.1016/j.jrurstud.2022.03.025

Narayan, D. (Ed.). (2005). *Measuring Empowerment: Cross-Disciplinary Perspectives*. The International Bank for Reconstruction and Development / The World Bank. https://doi.org/10.1177/146499340600600414

Newton, J., van Eerdewijk, A., & Wong, F. (2019). *What do participatory approaches have to offer the measurement of empowerment of women and girls* (No. 2019–1). https://www.kit.nl/wp-content/uploads/2021/03/KIT_WP_Participatory_Approaches-to-Measurement-of-Empowerment-of-women-and-girls.pdf

Ochieng, J., Afari-Sefa, V., Lukumay, P. J., & Dubois, T. (2017). Determinants of dietary diversity and the potential role of men in improving household nutrition in Tanzania. *PLoS ONE*, *12*(12), 1–18. https://doi.org/10.1371/journal.pone.0189022

Pavanello, S., Pozarny, P., & Paula De La O Campos, A. (2015). Qualitative research on women's economic empowerment and social protection: A research guide. In *Food and Agriculture Organization of the United Nations*. www.fao.org/economic/ptop

Peters, D. (2001). Gender and Transport in Less Developed Countries: A Background Paper in Preparation for CSD-9 Co-Coordinator. In *UN CSD Caucus on Sustainable Transport*. https://d1wqtxts1xzle7.cloudfront.net/66368520/Gender_and_Transport_in_Less_Developed_C20210420-18262-egjsmx.pdf?1618968149=&response-content-disposition=inline%3B+filename%3DGender_and_Transport_in_Less_Developed_C.pdf&Expires=1703859815&Signature=WVxtFP

Potgieter, C., Pillay, R., & Rama, S. (2006). *Women, Development and Transport in Rural Eastern Cape, South Africa*. South African National Roads Agency. Human Sciences Research Council. Gender and Development Unit.

Pretty, J. N., Morison, J. I. L., & Hine, R. E. (2003). Reducing food poverty by increasing agricultural sustainability in developing countries. *Agriculture, Ecosystems and Environment*, *95*(1), 217–234. https://doi.org/10.1016/S0167-8809(02)00087-7

Quisumbing, A. R., Meinzen-dick, R., Malapit, H. J., & Myers, E. (2022). *Can Agricultural Development Projects Empower Women?* (IFPRI Discussion Paper 02137, Issue October). https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/136405/filename/136617.pdf

Sadler, M. (2006). Vertical Coordination in the Cotton Supply Chains in Central Asia. In *The Dynamics of Vertical Coordination in Agrifood Chains in Eastern Europe and Central Asia: Case Studies* (No. 42; Working Paper N:42). http://documents.worldbank.org/curated/en/421071468749080930/pdf/370500ECSSD0WP1Eastern0ECA01PUBLIC1.pdf

Sen, A. (1985). Well-Being, Agency and Freedom: The Dewey Lectures 1984. *The Journal of Philosophy*, *82*(4), 169–221. https://www.jstor.org/stable/2026184

Snapp, S. S., & Fisher, M. (2015). "Filling the maize basket" supports crop diversity and quality of household diet in Malawi. *Food Security*, *7*(1), 83–96. https://doi.org/10.1007/s12571-014-0410-0

Teklewold, H., Kassie, M., Shiferaw, B., & Köhlin, G. (2013). Cropping system diversification, conservation tillage and modern seed adoption in Ethiopia: Impacts on household income, agrochemical use and demand for labor. *Ecological Economics*, *93*, 85–93. https://doi.org/10.1016/j.ecolecon.2013.05.002

Uteng, T. P. (2011). *Gendered Bargains of Daily Mobility: Citing cases from both Urban and Rural settings*. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=376cfd00df660d818bb3bd69fe01afd6782fdad9

Van den Broeck, G., & Maertens, M. (2016). Horticultural exports and food security in developing countries. *Global Food Security*, *10*(October 2017), 11–20. https://doi.org/10.1016/j.gfs.2016.07.007

Wachs, M. (2010). Women's Travel Issues: Creating Knowledge, Improving Policy, and Making Change. *Summary of the 4th International Conference, Volume 1: Conference Overview and Plenary Papers*, 41–49. https://doi.org/10.17226/22901

World Bank. (2019). *Farm Restructuring in Uzbekistan: How Did It Go and What is Next?* https://doi.org/10.1596/31248

Zorya, S., & Babaev, S. (2020). Cotton-Textile Clusters in Uzbekistan: Status and Outlook. *POLICY DIALOGUE ON AGRICULTURE MODERNIZATION IN UZBEKISTAN*, 1–20. https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---