



**ROLE AND CHALLENGES OF WOMEN IN BIOFORTIFIED DRY LAND ARROWROOTS FARMING IN MURANGA COUNTY**

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## ROLE AND CHALLENGES OF WOMEN IN BIOFORTIFIED DRY LAND ARROWROOTS FARMING IN MURANGA COUNTY

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### ABSTRACT

*The main purpose of this research was to investigate the role of biofortified dry land arrowroots in mitigating food security among rural women farmers' households in Muranga County. Specifically, the study sought to establish biofortified dry arrowroots and challenges experienced by women farmers in Muranga County. The Study was founded on the feminist theory. The study methodology included the use of semi-structured questionnaires, Focus group discussions and interviewing key informants. The study sampled 120 respondents. The qualitative and quantitative data was analyzed and a report prepared. The study achieved 83% response rate. The Study findings indicated that women farmers experienced myriad of challenges in growing dry land arrowroots from difficulty in obtaining seedlings and accessing finances to support the crop production. Conclusion of the study was that dry land arrowroots have significant effect on food security among women farmers in Muranga County. The findings however cannot be generalized in Kenya. The study recommended that the government needs to adopt biofortified dry land arrowroots farming production to address food insecurity in arid and semi-arid lands. The study further recommended studies in other Counties on dry land arrowroots to allow generalization.*

**Key Words:** Women in Agriculture, Arrow Roots Farming

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## INTRODUCTION

The United Nations (UN) estimates the Global population to be at 7 billion with a forecasted increase of an additional 2 billion by the year 2050 (United Nations, 2012). There are challenges in meeting food requirements of the growing population because of growing water scarcity and continued soil degradation (Garcias-Casal & Pena-Rosas, 2017). Women are perceived to significantly contribute to food production especially among the populations in the lower economic stratum. According to Valenca, Bake, Brouwer and Giller (2017) asserts that Biofortification provides a suitable intervention to address hunger and more specifically hidden hunger defined as deficiency in essential elements in food consumed. The use of biofortified foods show promise in feeding an estimated 2 billion people with perennial hunger problem (WHO, 2015).

In Muranga County a densely populated County is vastly considered a semi-arid region because of the pockets of dry land areas. Muranga County constitutes Maragwa, Kagema, Mathioya and Gatanga sub-counties. The Land tenure system is based on traditional practices that favour male heirs. Women suffer discrimination in land ownership as far a succession is concerned in spite of the majority of women being engaged in farming in Muranga County.

The continued farming of staple foods has left vast soils experiencing degradation. Gitau *et al.* (2016) in a study reported increasing cases of anemia and malnutrition among school going children in Kandara. The study revealed cases of hidden hunger among school going children associated with lack of diet diversification.

Kamoni *et al.* (2013) argued that food security can be enhanced using fortified crops that give better yields per unit of farm cultivated using modern farming methods. Kamoni *et al.* observed that modern farming methods which include, use of improved seed varieties, use of soil fertility enhancers and advanced farming methods that conserve soils and the environment. According to

World Health Organization (WHO) in Codex Alimentations (2015) micronutrients have a significant contribution to cognitive functions among school going children. In addition, nutrition adequacy is vital in maintaining health and fighting off diseases. In the Kenyan constitution, it is a constitutional right (article 43;1c) everyone has a protected right; right to food and freedom from hunger. The freedom guarantees all Kenyans the right have adequate good quality food, Constitution of Kenya, COK (2010).

### Statement of the Problem

Food insecurity in Muranga over the years has made many households to experience hunger especially the arid and semi-arid parts in Muranga County. Hunger and malnutrition has affected school children growth and education. Farmers in Muranga have embraced biofortified crops according to Covic *et al.* (2017). Despite biofortification efforts adoption, there is scarcity of research in Muranga on women farmers and the possible implications of biofortified dry land arrowroots.

The Kenya National Bureau of Statistics, (KNBS, 2019) estimate Murang'a County population as 1,056,640. There are 523, 940 Male and 532,669 Female according to the Kenya Population and Households Census (KPHC, 2019). The region is considered to be a dryland and consists of the following sub-counties; Maragwa, Kagema, Mathioya and Gatanga. Farmers in Muranga have been growing crops that are not biofortified consistently leading low food productivity due to insufficient rainfall exposing households to hunger. Bouis and Saltzman (2017) postulate that fortified starchy tubers like sweet potatoes and arrowroots are believed to hold the key to food security.

The depth of information about biofortified food crops grown in Muranga and the role of women in dryland arrowroots needed to be established. This inquiry sought to fill this knowledge gap concerning dry land arrowroots farming among women farmers' in Muranga County.

## Objective of the Study

The general objective of this study was to examine the role of biofortified crops in Mitigating Food Security in the rural households in Murang'a County; A case of women farmers of dry land arrowroots. The study was guided by the following specific objective;

- To examine the role of women farmers in dry land arrowroots farming in Murang'a County.

## LITERATURE REVIEW

### Feminist Theory

Feminist theory is described as a movement a philosophy guided by ideology of gender equality, and equal opportunities for women. Feminist Theory help shade light on forces that deliberately oppress, violate and practice inequality against female gender. The Feminist philosophy is multi-disciplinary from anthropology, sociology, economic and political thought in discourse. The theory presupposes that freedom is a necessity in the space where there is gendered labour distribution that reserves certain roles based on gender. Arendt thus suggests that freedom empowers women economically and politically both in public and private spaces. Hannah Arendt (1973) observed that feminist organizations have power in solidarity which is achieved in unity of purpose away from identity and race issues (Arendt, 1968). The feminism movements suffered in the past from the clash of ideologies and identity towards women empowerment. Feminist theory forms a significant basis of women to gain justice, freedom and social equality away from discrimination and abuse that women have experienced in society according to Dill and Kohlman (2012).

According to Ellen Dubois (1999) women have suffered untold injustice and rights violations by society mirrored on duties and resources allocations as dictated by society. Women remain strong economic contributors towards food production, caring for families and providing necessary labour for economic development.

According to Liam and Belinda (2015) in a study on gender and food security in Malawi there was glaring differences in the definition of gender. Gender according to the study is reviewed in regard to roles played by men and women at work and at home. This shows that gender differences and complexities is global and agrees with Arendt that gender in a way is describes division of labour.

The Feminist theory helps explain the gender contribution to food security and describe cultural roles in households. The feminist theory explains the role of women as a pillar towards food justice and food security. Therefore, women farmers in Muranga County roles are catalytic to households' economic empowerment towards food justice. The dryland arrowroots give hope to sustainable crop that meet farmers economic and sustenance needs.

### Empirical Studies

According to Resurreccion (2013) Women are key players' in sustainable development which includes agriculture and environmental protection. Women provide labour and also produce food in majority of households directly contributing to food security and nutrition. Women have many roles in society as care givers, managers of local household resources and also economic players at the local level, where they grow crops and nurture their families (Muthoni & Wangui, 2013).

Women suffer ill health and are vulnerable to hunger and malnutrition as mothers and expectant mothers due to increased dietary needs in addition to demands for labor and food production in the households. The increased dietary needs include lactation and caring for unborn babies when faced with under nutrition and iron deficiency according to Kimiywe and Chege (2015).

Female workers have been the backbone of agriculture and food production in many third world countries due to economic migration of men in search of work. Women are taking up more and more responsibilities including farming and food production. The effects of Men economic migration are seen in Nepal where most households are led

by women (Adikari *et al.*, 2015). FAO proposes that Women can contribute to higher crop yields by 20-30% thereby reducing global hunger by 17% through improved production (2012). FAO proposes increased engagement of women on agricultural production from policy to implementation for better food production. Women empowerment has a significant effect on food production and household food security from a study in South Africa according to Shauranga, Mudhara and Bogale (2016).

The land ownership system as currently constituted is a threat to food security in Kenya. Private land ownership with vast idle tracks of land and no economic or productive activity puts pressure land resources. Majority of small-scale farmers are men who hold titles while women till the land.

Moreover, the growing population is putting pressure on land causing scarcity and changes in land use thereby threatening food production (Ogechi & Hunja, 2014). According to Manji (2012), women are historically disadvantaged significantly with the land tenure system that reduces their ability to acquire credit to support farming activities. Land succession discriminated against the female gender contributing significantly to access to farm land for agricultural activities. In another study comparing land tenure system in Suba and Laikipia, Owoo and Boakye-Yiadou (2014) found no significant difference between women who own land titles and men with regard to food production. This implies that irrespective to land ownership food production output remains unchanged whether the land is owned by a woman or man. This contradicts previous believe that if women owned land, they would produce more agricultural produce. Therefore, a key determinant of economic progress and food security remains productive land use irrespective of ownership.

Women farmers face various challenges economically, socially, politically and culturally. UNDP (2016) recognized women as the backbone of world economies through their economic productivity. Women are marginalized in earnings

and productive labour. It is estimated that women constitute a significant contribution in the production of food in the world, according to Doss, Meinen-dick, Quisumbing and Thesis (2018). The UNDP (2016) asserts that in food production women face challenges with the land tenure system that is traditionally exclusively men dominated. Women lacking title deeds in the past excluded them from accessing finances to acquire assets and therefore limiting their personal growth according to Njiraini, Ngigi, and Barake (2018). Lack of information on markets and opportunities has forced women to form self-help groups for self-improvement.

Muranga is a vast County with varying micro-climates due to large pockets of dry land areas. There is significant agricultural activity in Muranga from tea farming, coffee farming, maize, beans, bananas, horticulture as well as dairy farming in the more fertile land areas. The drier parts of the County suffer from inadequate rainfall, changing climatic patterns and unreliable rainfall according to the County Government of Muranga (2019).

Literature shows that certain crops have been biofortified with micronutrients to make them nutritionally beneficial to consumers are adapted by women farmers. Among the crops that are fortified are arrowroots, Maize, Beans, Cassava and sweet potatoes. The study sets out to determine which fortified crops are grown by women farmers in Muranga County.

## **METHODOLOGY**

This study approach adopted a descriptive survey study design. The study design deployed qualitative and quantitative techniques in data collection. The study targeted women farmers in Muranga County. According to Muranga County (2019) the total land area is 2558 kilometers squared. The area geographically described 00 34' South, 107' South and longitudes 360 East and 370 27' East. Muranga County is surrounded by Nyeri County to the North, Embu County to the North East, Kirinyaga County to the West, Kiambu County to the South, And Machakos County to the East.

The study surveyed women farmers in Muranga County with purposive targeted sampling towards areas with many dryland arrowroot farmers from four sub-counties (Kangema, Mathioya, Gatanga and Maragwa) within Murang'a County. The research study was carried out covering the women farmers engaging in dry land arrowroot farming in order to determine food adequacy and nutritional needs contributed by dry arrowroots farming. The study deployed purposive sampling to collect data as objectively as possible from the target population of women farmers. The researcher utilized stratified sampling technique to select 120 dry land arrowroot farmers from across the four targeted sub-counties. The researcher used semi-structured questionnaires, a camera and notes taking and meeting minutes to collect data for analysis. The key informants were Ministry of Agriculture Official, County government officers and women leaders.

The researcher used women groups with organized structures among the women farmers' self-help groups comprising between 6-12 women for focused group discussions to collect qualitative data for analysis. The data was coded and entered into the computer for computation of descriptive statistics. The Statistical Package for the Social Sciences (SPSS Version 23.0) software was used to run descriptive statistics such as percentages, mean and standard deviation that help describe the data statistically.

## FINDINGS

### Challenges Faced by Women Farmers in Accessing Dry Land Arrowroots

Respondents were requested to indicate the extent of agreement to the below statements relating to challenges faced by women farmers in accessing seedlings for dry land arrowroots for planting in Muranga County. Results were presented in Table 1.

**Table 1: Challenges Faced by Women Farmers in Accessing Dry Land Arrowroots**

Statements	N	Mean	Std. Dev
Do you own the land that you farm?	100	3.79	0.49
It is easy to get dry-land arrowroots seedlings.	100	4.05	1.18
Seedling propagation is accessible to most farmers, with more seedlings I can increase my acreage	100	3.92	1.026
The county government and agricultural officers assist in the arrowroots farming	100	3.91	1.23
Acquiring seedling require a big budget	100	3.95	1.07

The study results in Table 1, it was established that, respondents strongly agreed that lack of titles reduces women's ability to get credit to access farm inputs like fertilizer, seedlings and farming equipment's. Lack of credit affects capacity of women economic development. The women experience a challenge in accessing dry land arrowroots seedlings, which prevent them from achieving food security as shown by the mean score of 4.05. The study found out that respondents strongly agreed that women in Muranga with access to seedlings are able to cultivate large farms with arrowroots. Women have limited access to government advisory services. The women farmers

lamented that they are rarely visited in their farms except during large farmers meetings do they find agricultural extension officers. The women farmers reported that getting dryland seedlings require a large sum of money because a seedling costs five shillings. The study confirmed that have limited access to financial support to access seedlings and

### Role of Women in Household Food Security through Arrowroots farming

Respondents were asked to declare the extent of agreement to the below statements relating to the role of women in household food security. Results were presented in Table 2.

**Table 2: Role of Women in Household Food Security-through arrowroots farming**

Statements	N	Mean	Std. Dev
Women are leading food producers; they grow food consumed by their families and majority of the households	100	3.65	1.15
Women are active players in food production, meeting energy needs and conservation needs.	100	3.79	1.49
Women grow food to feed their families and sell excess produce. Women suffer access to farm inputs that directly affect food production.	100	3.75	1.12
Women farmers are savers of income through women groups/self/help groups, and that play an active role in managing household risks during disasters.	100	3.93	1.83

According to the study results, the study established that respondents strongly agreed that women are better at saving incomes generated compared to men, and tend to manage household food needs during droughts and other natural disasters as indicated by the mean score of 3.93. In addition, the study found out that respondents agreed that women are the main managers in food production, and energy utilization.

Further, it was established that respondents moderately agreed that women are active food producers as farmers and laborer's playing a role in feeding their households as indicated by the mean score of 3.65. The study results conform to Ogutu (2015) who argues that women groups accord women social capital. The women groups provide social networks for learning and social insurance against life challenges. The respondents intimated that the women groups helped popularize dry land arrowroots farming. Women organize themselves to offer labour by pooling collective capital that they control. This shows that women control capital in terms of labour capacity and availability of its mobilization. Women groups in the past rarely received farm visits for knowledge exchange. The Self- help provides women with a platform to gain through trainings and capital from members' contributions.

In addition, respondents indicated that women lack farm inputs, technical support, and access to quality

seedlings and markets for their dry land arrowroots crop. One respondent lamented that *"arrowroots that are long maturing take too much land resources where land is scare, hence, we prefer to grow faster maturing crops that assures them income and food"*.

#### Discussion of Study Findings

On the challenges faced by women farmers in accessing dry land arrowroots seedlings in Muranga County, the study established that respondents strongly agreed with a mean score of 4.05. On the issue of land tenure relationship with food security is inconclusive Owoo and Boakye-Yiadow (2014) in a Study demonstrated that land owners and food production are not collerrated. However, the poor benefit from access to land for food production (Ogechi & Hunja, 2014). Lack of titles as a sign of land ownership limits the capacity of women to access financial support from financial institutions.

The study found out that respondents strongly agreed with mean scores of 3.95, 3.92 and 3.91 that many women in developing countries lack control over the household income and budgets because they work in own farms and produce is consumed within the family with very little surplus. The lack of income possibilities tends to limit women's as well as income generation opportunities. Women naturally are more vulnerable and are affected by hunger and malnutrition especially by iron deficiency and undernourishment during pregnancy

and lactation. Women experience challenges in accessing financial and also face inequities in accessing farm inputs such as seeds and fertilizers, technology, market information, knowledge, skills and advisory services. The study findings agree with Manji, (2012) who posit that land for many years has been passed on to male heirs disregarding daughters leaving women powerless in making decisions regarding food security and long-term investments.

On the role of women in household food security in Muranga County, the study established that respondents strongly agreed with a mean score of 3.93 that women save part of their incomes as security for emergencies and potential difficulties. Women participate in self-help groups in this case women farmers groups for information, education, savings and self-growth. Women support each other against risks thus improving the household's food security in times of natural disasters, such as drought as indicated by the mean score of 3.93. In addition, the study found out that respondents agreed with a mean score of 3.79 and 3.75 that women are the main managers of natural resources and also that women are responsible to their families and societies well-being. It is evident women play a significant in motivating household food security.

#### **CONCLUSION AND RECOMMENDATIONS**

On the of challenges faced by women farmers in accessing dry land arrowroots in Muranga County, the study established that lack of land ownership based on historical land tenure discriminates and excludes women towards access to financial loans to finance farming activities like buying inputs, and dry land arrowroots seedlings. The women farmers

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can benefit from land ownership and financial support against titles as collateral to support farming activities financing.

The study concluded that women farmers can support food production and ensure food security through access to farm inputs and access affordable credit necessary for financing farming operations.

Based on the study findings, the study recommended the following:

- Women farmers need to be encouraged to adopt dry land arrowroots farming needs to be considered as a potential intervention in mitigating food insecurity.
- Women farmers need to be supported to acquire dry land arrowroots seedlings to enhance dry land arrowroots production as a source of food as well as income generation at the local level in the community.
- Women need support in seedling propagation and training on modern farming methods to enhance food production and food security in the community.
- Government policy needs to adopt biofortified crops like dry land arrowroots farming as a strategy to achieve food security in Kenya among Arid and semi-arid lands.

#### **Areas of Further Research**

The results that were obtained cannot be generalized in all counties in Kenya. Thus, the study recommended that further study in other counties to allow generalization of study results.

Studies ought to be undertaken examining how adoption of drought resistant biofortified food crops helps in alleviating food insecurity among communities living in arid and semi-arid areas in Kenya.



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