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Case Study on High-Yield Fresh-Eating Sweet Potato Varieties: Cultivation Practices in Subtropical Regions

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Abstract This study explores the cultivation and optimization of high-yield fresh-eating sweet potatoes in subtropical regions, highlighting their key role in agriculture, markets, and nutrition. It covers the agronomic and environmental conditions required for growth, such as soil, temperature, and rainfall, and proposes strategies to address cultivation challenges. The study analyzes the characteristics of major fresh-eating sweet potato varieties, including taste, yield, and disease resistance, and summarizes key practices for yield optimization, such as soil preparation, irrigation management, and integrated pest control. A case study from a specific region demonstrates the performance of different varieties and the practical experiences of farmers. The research also examines the interaction between environmental factors and management practices and their impact on yield, suggesting future trends in economic benefits and technological applications while emphasizing the importance of policy support. This study provides valuable guidance and reference for enhancing productivity and sustainable development of high-yield fresh-eating sweet potatoes in subtropical regions.
Keywords Sweet potato cultivation; Subtropical agriculture; Orange-fleshed sweet potato (OFSP); Integrated pest management (IPM); Sustainable farming practices

1 Introduction

Fresh-eating sweet potatoes (*Ipomoea batatas*) are crucial crops in subtropical areas, offering both nutritional and economic benefits. They thrive under various environmental conditions, making them a resilient choice for smallholder farmers in regions with marginal soils and variable rainfall patterns (Motsa et al., 2015; Zhapar et al., 2023). Sweet potatoes serve as staple food sources in developing regions, while their high antioxidant content, vitamins A and C, and dietary fiber make them increasingly popular in health-conscious markets worldwide. Additionally, the crop plays a role in sustainable agriculture by contributing to crop rotation systems, reducing pest incidence, and improving soil fertility (Motsa et al., 2015).

High-yield fresh-eating sweet potato varieties benefit farmers and consumers alike. For farmers, they ensure stable yields and incomes, even in environments with limited inputs, while promoting resilience against climate stressors (Zhapar et al., 2023). In the consumer market, orange-fleshed sweet potatoes (OFSP) are in demand for their health benefits and are being used in nutritional programs aimed at combating vitamin A deficiency, particularly in Africa and Asia (Motsa et al., 2015). These varieties also have market appeal due to their sweet flavor, attractive texture, and potential to meet rising consumer demands for functional foods.

This study explores effective cultivation practices to optimize yield and quality of high-yield fresh sweet potato varieties in subtropical regions, focusing on best practices such as soil preparation, irrigation management, pest and disease control, and nutrient application to enhance productivity under changing environmental conditions. It aligns with global food security efforts by providing insights that support sustainable agriculture, helping small-scale farmers meet market and nutritional demands, identifying resilient sweet potato varieties and effective cultivation practices to address climate change challenges and promote rural development.

2 Agronomic and Environmental Requirements

2.1 Growth requirements for fresh-eating sweet potatoes: soil, temperature, and rainfall

Fresh-eating sweet potatoes thrive in well-drained, sandy loam soils with a pH range of 5.5 to 6.5, although they tolerate soils with moderate nutrient levels (Motsa et al., 2015). Ideal temperatures for growth are between 21 °C and 26 °C. Excessively high temperatures favor vine growth over tuber development, while night temperatures below 15 °C reduce productivity. Rainfall of 500-700 mm throughout the growing season is optimal (Navarro et al., 2020), with a need for adequate moisture during the early establishment phase but less during the root development period (Zhapar et al., 2023; Li, 2024b) (Figure 1).

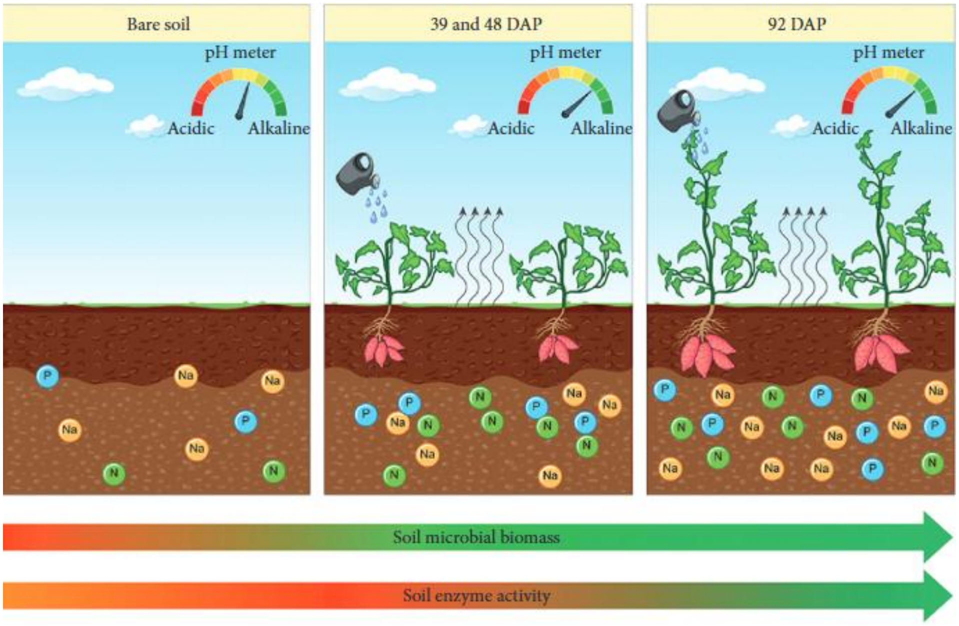

Figure 1 Cultivation of fresh-eating sweet potatoes and drip irrigation under suitable environmental conditions: chemical and biological changes in the soil, DAP = days after planting (Adopted from Navarro et al., 2020)

2.2 Opportunities and challenges of sweet potato cultivation in subtropical regions

Subtropical regions provide favorable conditions for growing sweet potatoes, but challenges such as irregular rainfall patterns and heat stress limit consistent production. Climate change adds unpredictability, but the crop's resilience makes it suitable for sustainable agriculture. Opportunities include using improved, high-yield varieties like orange-fleshed sweet potatoes (OFSP) to meet both nutritional demands and market preferences. Moreover, smallholder farmers benefit from the crop’s short maturity period and ability to grow in marginal soils (Cheboi et al., 2024; Motsa et al., 2015).

2.3 Nutritional and management needs at different growth stages

Fresh-eating sweet potatoes have distinct nutrient needs across growth stages. Early in the season, nitrogen promotes vine growth, but excess nitrogen can reduce tuber yield if not managed properly. Phosphorus is essential during establishment for root development, while potassium supports tuber formation and enhances disease resistance later in the season (Li, 2024a). Nutritional deficiencies-especially in nitrogen, potassium, and boron-can lead to poor vine health or low-quality tubers (Zhapar et al., 2023). Proper irrigation is critical in the early growth stages, with reduced watering during harvest to prevent tuber rot.

3 Overview of High-Yield Fresh-Eating Sweet Potato Varieties

3.1 Common fresh-eating sweet potato varieties and their traits in subtropical regions

Beauregard and Jewel are among the most popular fresh-eating varieties grown in subtropical regions. Beauregard is valued for its high beta-carotene content, sweet flavor, and high yield, often exceeding 20 tons per hectare under optimal conditions (Motsa et al., 2015). Jewel, known for its smooth texture and resistance to cracking, also performs well in both local and export markets (Lamaro et al., 2023). Additionally, OFSP varieties have gained prominence, particularly in Africa and Asia, where they are used to combat vitamin A deficiency (Low et al., 2020). These varieties exhibit strong adaptability to subtropical climates and thrive with moderate rainfall and well-drained soils (Daood et al., 2024; Cheboi et al., 2024).

‘Xin Xiang’ and ‘Yan Shu 25’ are the two largest fresh sweet potato varieties planted in China. ‘Xinxiang’ is a representative variety of mini sweet potatoes due to its beautiful appearance, good marketability, delicate flesh, thin skin like paper, low crude fiber content, high soluble sugar content, and a powdery, sweet, fragrant, and glutinous taste. Due to its high yield and high content of carotenoids, ‘Yanshu 25’ has a golden yellow color of inner tuber after steaming or boiling, high sweetness, strong aroma, and delicate flesh. It is used for baking potatoes and has an excellent taste, earning it the title of ‘Roast Potato Queen’ among consumers (Figure 2).

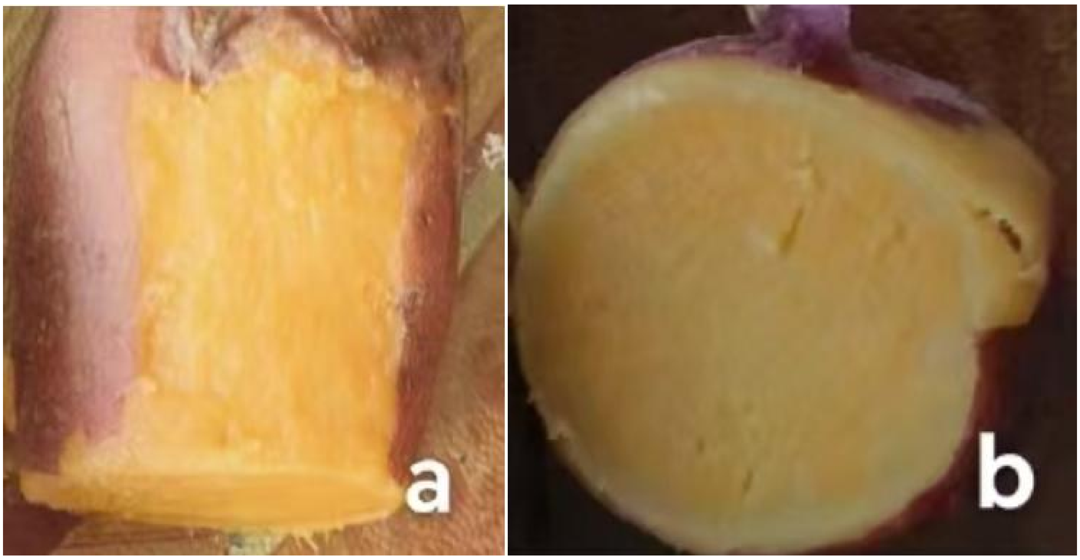

Figure 2 Fresh sweet potato varieties ‘Xinxiang’ and ‘Yanshu 25’, there are color of sweet potato chunks after steaming and cooking (photo by Xihu Li).
Image caption: a: Tuber inner color of ‘Heart Fragrance’; b: Tuber inner color of ‘Yan Shu 25’

3.2 Key selection criteria: taste, yield, disease resistance, and market adaptability

The selection of high-yield fresh-eating sweet potato varieties hinges on several factors. Taste and texture are critical, as sweeter varieties with smoother textures attract more consumers. Yield potential is another key factor, with optimal varieties yielding 20~30 tons per hectare (Cheboi et al., 2024). Disease resistance is essential for sustainable cultivation, with resistance to pests like the sweet potato weevil and diseases such as black rot ensuring crop viability (Laurie et al., 2017). Market adaptability further influences variety selection; varieties must meet consumer preferences and withstand post-harvest challenges such as transport and storage, ensuring they maintain quality through the supply chain (Low et al., 2020; Alam, 2021).

3.3 Regional market demand and consumer preferences for fresh-eating varieties

Regional demand for fresh-eating sweet potato varieties is rising, driven by increased awareness of their health benefits and culinary versatility. In Africa and Asia, orange-fleshed varieties are promoted for their high beta-carotene content, which supports public health initiatives aimed at reducing vitamin A deficiency (Low et al., 2020). These varieties are popular not only for home consumption but also as ingredients in processed foods, including snacks, baked goods, and baby foods, expanding their market reach (Cheboi et al., 2024). In Zhejiang, Some consumers prefer high dry rate varieties, such as ‘Zhe Shu 75’, and demand a powdery taste; However, some consumers prefer low dry weight varieties such as ‘Xinxiang’, which require a soft and sticky taste. In addition, the growing trend toward healthier diets has increased consumer demand for nutrient-dense foods, positioning fresh-eating sweet potatoes as an attractive option for health-conscious consumers globally.

4 Cultivation Practices for Yield Optimization

4.1 Soil preparation and planting techniques

Proper soil preparation is essential for ensuring optimal root development and high yields. Fresh-eating sweet potatoes grow best in well-drained sandy loam soils with a pH between 5.5 and 6.5 (Motsa et al., 2015). Fields should be cleared of weeds and large debris, and plowing should be done to a depth of 25~30 cm to facilitate root expansion (Harvey et al., 2022). Raised ridges or mounds are recommended to improve drainage and prevent waterlogging, especially in areas with high rainfall. Planting should be timed with the onset of the rainy season to ensure adequate soil moisture for sprouting (Low et al., 2020). Vine cuttings of 20~30 cm, with at least three nodes, should be used for planting. A spacing of 30 cm between plants and 75~90 cm between rows allows sufficient space for root enlargement and minimizes competition (Cheboi et al., 2024).

4.2 Irrigation and water management

Efficient water management is critical, especially during the establishment and tuber initiation stages. Sweet potatoes require consistent soil moisture early in the growing season but prefer drier conditions as harvest approaches to prevent tuber cracking and rot (Zhapar et al., 2023). Drip or furrow irrigation is recommended to optimize water use and reduce water stress, especially in regions with limited rainfall. Overwatering should be avoided, as it can lead to poor aeration and root rot. In areas where rain is unpredictable, supplemental irrigation ensures steady crop growth and enhances tuber quality (Laurie et al., 2017).

4.3 Fertilizer application and nutrient management

Balanced nutrient management is crucial for achieving high yields and quality tubers. Sweet potatoes require nitrogen for early vine growth, phosphorus for root development, and potassium to enhance tuber formation and disease resistance (Low et al., 2020). Organic matter such as compost or manure can improve soil structure and nutrient availability. A typical fertilization schedule includes a basal application of phosphorus and potassium at planting, followed by nitrogen top-dressing three to four weeks later (Martins et al., 2023). Excess nitrogen should be avoided in later stages, as it promotes vine growth at the expense of tuber development (Cheboi et al., 2024). Boron is also essential to prevent cracking and internal necrosis of tubers. Regular soil testing ensures that nutrient deficiencies are identified and corrected promptly for optimal crop performance (Islam et al., 2022).

5 Disease and Pest Management

5.1 Common diseases and pests affecting fresh-eating sweet potatoes

Fresh-eating sweet potatoes are affected by several pests and diseases that impact yield and tuber quality. Among the most damaging pests are sweet potato weevils (*Cylas formicarius*), which attack both vines and tubers, leading to significant crop losses, particularly in dry seasons when soil cracking allows easier pest access. Other threats include whiteflies and aphids, which transmit viral diseases like sweet potato feathery mottle virus (SPFMV) (Longdom, 2021a; Wikifarmer, 2023). Fungal diseases such as black rot and leaf spot also reduce productivity, especially in warm, humid climates (Wikifarmer, 2023). Proper pest and disease management is critical for maintaining high yields and ensuring marketable tubers.

5.2 Integrated pest management (IPM) strategies and best practices

Integrated pest management (IPM) strategies are essential for sustainable control of sweet potato pests and diseases. IPM approaches combine crop rotation with non-host plants, biological control using parasitoid wasps, and mechanical methods like pheromone traps for monitoring weevil populations. Applying organic fungicides and neem-based insecticides provides an eco-friendly alternative to chemical controls, reducing environmental harm (Longdom, 2021b). Early planting and timely weeding are essential practices to avoid pest build-up, and reflective mulches can deter whiteflies and aphids. Additionally, scouting and monitoring help detect infestations early, enabling targeted control before outbreaks occur (Wikifarmer, 2023).

5.3 Development and use of resistant varieties in subtropical regions

The use of resistant sweet potato varieties is crucial for managing diseases and pests effectively. In subtropical regions, orange-fleshed sweet potato (OFSP) varieties with enhanced resistance to pests like weevils and viral infections are increasingly adopted (Low et al., 2020). These varieties reduce the need for chemical pesticides, making cultivation more sustainable and cost-effective (Teshome et al., 2020). Breeding programs focus on improving resistance to fungal pathogens and optimizing post-harvest qualities, ensuring higher marketability and lower storage losses (Laurie et al., 2017). The introduction of pest-resistant cultivars not only enhances productivity but also promotes food security by minimizing losses from biotic stressors (Gibson and Aritua, 2022).

6 Case Study: High-Yield Fresh-Eating Sweet Potato Cultivation in Subtropical Regions

6.1 Overview of the selected study region's climate and environmental conditions

The selected study region for this case is a subtropical agricultural zone in East Africa, characterized by moderate rainfall, warm temperatures, and relatively high humidity during the growing season (Stathers et al., 2018). The annual rainfall in this region averages between 500 and 800 mm, which provides adequate moisture for sweet potato cultivation (Ndungu et al., 2016). However, the rainfall pattern is bimodal, with distinct dry and wet seasons, which creates challenges in water management (Cheboi et al., 2024). The average temperature ranges from 18 °C to 30 °C, with optimal growing conditions occurring during cooler months. Soils in this region are sandy loams with good drainage, essential for preventing root rot and promoting tuber formation (Motsa et al., 2015; Low et al., 2020; Wikifarmer, 2023).

6.2 Analysis of performance of the studied fresh-eating sweet potato varieties

The study analyzed the performance of six high-yield fresh-eating sweet potato varieties. The field trial results showed that the trial locations were divided into two different climatic regions: warm temperate and cool subtropical. The Mvuvhelo variety performed particularly well at Ulundi 1 (47.4 t/ha) and Ekangala 2 (44.0 t/ha), while its total yield was very low at Ladysmith (8.1 t/ha), Nongoma 1 (10.5 t/ha), and Vryheid 1 (11.0 t/ha) (Figure 3). Ekangala 2 (37.9 t/ha), Ulundi 1 (36.5 t/ha), and Soshanguve (36.1 t/ha) showed the highest total yield, whereas Nongoma 2 (10.1 t/ha), Vryheid 1 (14.1 t/ha), and Winterveldt (17 t/ha) had lower average total yields (Figure 3). Among all varieties, timely sowing and regular irrigation in the early growth stage significantly increased yield and improved storage root quality. Additionally, crop performance was closely related to soil fertility management and pest control measures (Laurie et al., 2017; Zhapar et al., 2023).

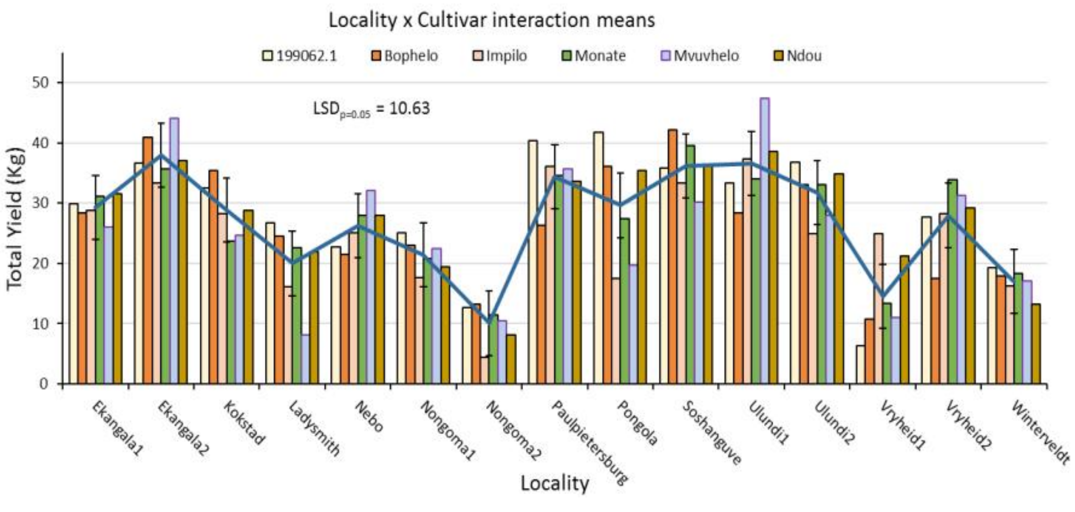

Figure 3 Locality by cultivar interaction means for total yield for six cultivars by 15 on-farm trials (localities) (Adopted from Laurie et al., 2017)

6.3 Insights from local farmers and their cultivation practices

Interviews with local farmers revealed that successful cultivation depends heavily on the timing of planting to align with the rainy season and ensure sufficient soil moisture for vine establishment (Eitzinger et al., 2019). Farmers emphasized the importance of organic fertilizers and compost in maintaining soil health, especially given the sandy soils' tendency to leach nutrients (Nairn and Forster, 2019). Additionally, farmers adopted ridge planting and mulching techniques to improve soil aeration and prevent moisture loss (Wikifarmer, 2023). They also reported the use of pest monitoring and early harvesting strategies to avoid losses from sweet potato weevils, which are common in dry conditions (Longdom, 2021b). Furthermore, many farmers have integrated OFSP varieties into their crop rotations due to their higher market value and demand for nutritionally enhanced foods. However, challenges such as limited access to quality planting materials and fluctuating market prices remain concerns for growers (Vannini et al., 2023; Cheboi et al., 2024).

7 Optimizing Agricultural Yield and Quality

7.1 Effects of cultivation practices on yield and quality

The study confirmed that implementing optimized cultivation practices significantly improved both the yield and quality of fresh-eating sweet potatoes (Wang et al., 2016). Fields using ridge planting and mulching techniques produced tubers with smoother textures and fewer deformities due to enhanced soil aeration and moisture retention (Zhapar et al., 2023). The average yield for Beauregard and Jewel varieties ranged between 23 and 27 tons per hectare under these practices, with the orange-fleshed sweet potato (OFSP) variety producing slightly lower yields but with higher beta-carotene content, aligning with the nutritional goals of food security programs (Low et al., 2020; Cheboi et al., 2024). Effective irrigation management, particularly drip irrigation, minimized water stress and improved tuber size consistency, while avoiding excessive watering prevented cracking and rot (Zhou et al., 2023). Fertilizer application practices that balanced nitrogen, phosphorus, and potassium (NPK) further supported optimal root development and increased disease resistance (Laurie et al., 2017).

7.2 Interaction between environmental factors and management practices

The interaction between environmental conditions and cultivation techniques proved crucial in maximizing yield and quality. Subtropical climates with bimodal rainfall patterns posed challenges for consistent production, but timely planting during the onset of rains ensured better crop establishment (Cheboi et al., 2024). In years with erratic rainfall, supplementary irrigation improved outcomes, confirming the need for adaptive management. Variations in soil fertility across different regions also impacted tuber quality, highlighting the importance of site-specific nutrient management strategies (Shock et al., 2021; Pouliniti et al., 2022). For example, regions with sandy soils required more frequent organic matter inputs to maintain fertility and prevent nutrient leaching (Zhapar et al., 2023). Furthermore, integrated pest management (IPM) approaches, such as the use of resistant varieties and pest monitoring, proved essential in reducing the impact of diseases like sweet potato weevils under different environmental conditions (Longdom, 2021a; Wikifarmer, 2023).

7.3 Challenges encountered and strategies to overcome them

Farmers faced several challenges during cultivation, including limited access to quality planting materials and fluctuations in market prices, which impacted profitability (Cheboi et al., 2024). Environmental challenges, such as unpredictable rainfall, increased the need for flexible irrigation solutions and water management practices. Weevil infestations posed another significant threat, particularly during dry seasons when soil cracking exposed tubers to pest attacks (Longdom, 2021a). To mitigate these challenges, farmers adopted a combination of early planting schedules, ridge planting to improve drainage, and the use of OFSP varieties with enhanced resistance to common pests (Rajasekhara and Mohan, 2022). Additionally, collaborative extension programs provided training in IPM strategies, helping farmers adopt more sustainable practices and reduce their reliance on chemical inputs (Wikifarmer, 2023). Strengthening local seed systems to ensure consistent availability of high-quality planting materials also emerged as a priority for long-term agricultural resilience (Low et al., 2020).

8 Implications for Farmers and Regional Agriculture

8.1 Economic benefits of high-yield fresh-eating sweet potato cultivation

High-yield fresh-eating sweet potato cultivation offers numerous economic benefits for farmers and contributes to regional agricultural sustainability. These varieties provide farmers with reliable income due to higher market demand, especially for orange-fleshed sweet potatoes (OFSP), which are promoted for their health benefits (Low et al., 2020). The shorter growing cycles-90 to 120 days-allow farmers to fit multiple planting seasons within a year, enhancing productivity (Duque et al., 2022). Furthermore, high-yield varieties improve profitability by reducing input costs through disease-resistant cultivars, which limit the need for chemical pesticides (Laurie et al., 2017). Studies show that integrating these varieties into crop rotations also reduces fallow periods and improves soil fertility, leading to long-term economic gains for farmers (Cheboi et al., 2024).

8.2 Adoption of key technologies and extension efforts

The adoption of technologies such as drip irrigation, mechanized planting, and integrated pest management (IPM) practices has significantly enhanced sweet potato productivity in subtropical regions (Longdom, 2021a). Farmers implementing improved irrigation systems reported higher water-use efficiency and better tuber quality, even during dry seasons (Zhapar et al., 2023). Access to improved OFSP planting materials through seed systems and agricultural cooperatives has also encouraged the widespread cultivation of these varieties, increasing yields and profitability (Qin et al., 2022). Extension efforts have played a key role in disseminating knowledge about new technologies and best practices. Collaborative initiatives involving government agencies, NGOs, and research institutions have provided training on crop management, pest control, and post-harvest practices, helping farmers maximize returns (Wikifarmer, 2023).

8.3 Role of agricultural policies and support services in promoting sweet potato cultivation

Agricultural policies and support services are essential for scaling up sweet potato production and ensuring long-term sustainability. Subsidies and grants for irrigation equipment, fertilizers, and improved planting materials have reduced the financial burden on farmers, facilitating the adoption of advanced farming techniques (Motsa et al., 2015). Additionally, nutrition-sensitive agriculture policies that promote OFSP varieties align with public health objectives, providing markets with both economic and social incentives to adopt these varieties (Low et al., 2020). Regional agricultural services have also focused on strengthening seed systems to ensure the availability of certified, disease-free planting materials, which improves yields and farmer confidence (Fuglie and Tschirley, 2019). Market development policies aimed at improving access to export opportunities further motivate farmers to engage in large-scale production, making sweet potato cultivation a viable and attractive agricultural enterprise (Cheboi et al., 2024).

9 Future Directions and Emerging Trends

9.1 Advances in breeding for drought resistance, disease resistance, and higher yields

Significant advancements in breeding have focused on developing sweet potato varieties with improved drought tolerance, disease resistance, and higher yields. Research programs have introduced biofortified orange-fleshed sweet potato (OFSP) varieties, which offer higher beta-carotene content and perform well in regions prone to drought (Low et al., 2020). New molecular tools, including marker-assisted selection (MAS), are being employed to accelerate the development of varieties with resistance to Cylas weevils and soil-borne pathogens (Laurie et al., 2017; Zong et al., 2023). Additionally, genetic research focuses on developing drought-resistant varieties that maintain productivity with reduced water inputs, contributing to sustainable farming in regions experiencing climate variability (Zhapar et al., 2023). Collaborative breeding initiatives across Africa, Asia, and Latin America ensure that farmers have access to improved varieties tailored to their local environmental conditions (Cheboi et al., 2024).

9.2 Potential of precision agriculture and smart management tools

Precision agriculture offers new opportunities to optimize sweet potato production through smart technologies such as remote sensing, drones, and IoT-based irrigation systems (Wolfe et al., 2022). Farmers in subtropical regions have begun using drip irrigation controlled by soil moisture sensors to ensure efficient water use (Zhapar et al., 2023). Additionally, mobile apps and digital platforms are being developed to provide real-time guidance on pest detection, fertilizer application, and market trends (Longdom, 2021b). Smart tools can also improve crop monitoring through satellite-based imaging, helping farmers predict yields and make timely decisions about harvesting and pest management (Wikifarmer, 2023). These innovations enable sustainable intensification of sweet potato production while reducing input waste and environmental impact.

9.3 Policy recommendations to promote sustainable sweet potato farming

To scale up sustainable sweet potato farming, governments and agricultural stakeholders need to implement targeted policies. Incentives for adopting climate-resilient varieties and sustainable technologies are essential. Policymakers should promote subsidies for drip irrigation systems and provide training in integrated pest management (IPM) techniques to reduce chemical dependency (Cheboi et al., 2024). Strengthening seed systems and supply chains is another priority, ensuring that farmers have continuous access to high-quality planting materials (Low et al., 2020). Furthermore, policies should focus on expanding market access and value chains, including partnerships with food processing industries, to boost demand for fresh-eating and value-added sweet potato products (Motsa et al., 2015). These efforts will not only enhance food security but also support rural economies and improve farmers' resilience to climate change (Mwanga et al., 2021).

10 Conclusion

This study on high-yield fresh-eating sweet potato varieties in subtropical regions demonstrates that optimized cultivation practices significantly enhance both yield and quality. Key findings include the importance of ridge planting, mulching, and balanced fertilizer application in improving productivity. Drip irrigation and pest monitoring systems helped manage water stress and pests effectively, maintaining crop health even under variable environmental conditions. The introduction of orange-fleshed sweet potato (OFSP) varieties not only contributed to higher market returns but also aligned with public health goals by addressing vitamin A deficiency. However, challenges such as weevil infestations, unpredictable rainfall, and limited access to quality planting materials highlight the need for further interventions.

For farmers, adopting integrated pest management (IPM) practices and investing in irrigation systems like drip irrigation is crucial for managing environmental challenges. Regular training through extension programs can help farmers implement improved agronomic practices efficiently. Policymakers should prioritize subsidies for irrigation equipment and certified planting materials to support smallholders. Strengthening local seed systems will ensure year-round access to high-quality, disease-resistant varieties. Moreover, policies that promote market development and value-added processing will improve profitability for farmers. Researchers should focus on developing climate-resilient varieties with enhanced drought and disease resistance. Collaborative breeding programs across regions will accelerate the adoption of these varieties and support sustainable sweet potato production. Research on precision agriculture tools, such as remote sensing for pest detection, should also be prioritized to enhance management efficiency.

Enhancing fresh-eating sweet potato production in subtropical regions requires a multi-faceted approach that integrates advanced agronomic practices, improved breeding techniques, and supportive policies. Collaboration between farmers, researchers, and policymakers is essential to address challenges such as climate variability and pest outbreaks effectively. Expanding market opportunities through value-added products and public health initiatives will further boost the demand for fresh-eating sweet potatoes. Ultimately, sustainable production practices will not only ensure food security but also contribute to the economic empowerment of rural communities. Continued innovation in agricultural technology and extension services will play a key role in shaping the future of sweet potato farming.

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Conflict of Interest Disclosure

The authors affirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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