Supplementary Material

**Table 1** Characteristics and findings of individual studies for determinant of Orange-Fleshed Sweet Potato (OFSP) adoption in SSA

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Adekambi et al., 2020a) | Ghana and Nigeria | smallholder farm households in Ghana and Nigeria | A multistage sampling technique used to select farmers; data collected via face-to-face interviews of 345 and 381 sweet potato farmers in Ghana and Nigeria respectively, using structured questionnaires. | OFSP adoption rates in 2016 could have been nearly 61% in Ghana and 42% in Nigeria, instead of the observed sample adoption rate of 51 and 33%, respectively, if the whole population was exposed to the OFSP varieties. | OFSP adoption rates through intensified dissemination and awareness creation activities could significatively affect OFSP adoption rate in these countries | Low |
| (Shikuku et al., 2019) | Tanzania | households | Random sample of 434 rural households surveyed in two regions in Tanzania (Mara and Mwanza). Sampling followed a multi-stage sampling technique. Regression analysis with farmers’ beliefs about OFSP as explanatory variables. | Farmers’ beliefs that OFSP was nutritionally superior to WFSP influenced the likelihood of growing an OFSP variety and the proportion of OFSP roots out of total production for a household. | Farmers’ beliefs towards OFSP are multidimensional and related to health benefits, yielding ability, early maturity, taste and being liked by children, disease resistance, storability, and source of the orange color. Such beliefs influence the decision and intensity of cultivating planting material of OFSP varieties. | Medium |
| (Lagerkvist et al., 2016) | Kenya | caregivers of children < 5 years or pregnant women in each of the study households | Five counties in western Kenya, 501 caregivers of children aged < 5 years or pregnant women selected randomly | Detailed information about nutritional benefits decreased consumer acceptance, the impact of information on OFSP acceptance was related to household food insecurity status and the way the information was presented, rather than income or age of the participants. | Importance to shoes the efficient way to provide nutrition information of OFSP to the targeted population | Low |
| (Caeiro and Vicente, 2020) | Mozambique | Women caretakers of preschool children | Treatment to 49 female farmers across 9 villages in the Matutuíne district. The treatment consisted of providing information about nutrition, farming, and cooking related to orange-fleshed sweet potato (OFSP) varieties. | Increasing in knowledge about nutrition, cooking and planting OFSP. Evidence of short- and medium-term adoption of OFSP for production, which was spread through social networks. | Nutritional education has positive impact on OFSP adoption in Mozambique. | Low |
| (Ndaula et al., 2021) | Uganda | farmers | Survey of 341 randomly selected farmers from two rural districts in Uganda and an interview with a subsample of 42 farmers. Data analyzed using content analysis | OFSP acceptance was linked to social factors and network effects | Network effects play a role in farmers' decisions to switch from white-fleshed sweet potato to OFSP. | Medium |

**Table1** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Lagerkvist et al., 2020) | Kenya | women | 764 women from four different categories (pregnant women, women with infants, women with young children, and potential mothers) selected randomly to received verbal or verbal and visual demonstrations on OFSP-based foods. structural equation model of predicted intentions based on an extended Theory of Planned Behavior (TPB) was used. | Knowledge of the health benefits of orange-fleshed sweet potato did not have a positive effect on the intention to adopt the crop | The study found that goal-setting, perceived behavior control, subjective norms, and attitudes have a significant influence on the intention to integrate biofortified orange-fleshed sweet potato in proper complementary feeding, but knowledge of its health benefits did not have a positive effect. | Low |
| (Jenkins et al., 2018) | Mozambique | Farmers | Research conducted in 3 Mozambique provinces. Participation of 95 OFSP stakeholders in semi-structured interviews and focus groups to assess their progress in the 5 stages of the Innovation-Decision process in the Diffusion of Innovations Theory. | Organoleptic qualities, taste preferences, access to planting material, agronomic traits, environmental conditions, lack of capital for inputs and labor, unstable markets, and limited sharing of information and planting material across farmer networks | Positive effect of health benefit adoption, and organoleptic effect, negative effect of unstable markets on OFSP adoption | Low |
| (Ojwang et al., 2021) | Kenya | rural farming households with preschoolers and no prior engagement with OFSP | Cluster-randomized controlled trial conducted on 431 preschooler-caregiver pairs. Three interventions (OFSP-branded exercise books and posters for preschoolers, OFSP-oriented mobile phone text messages for caregivers, and combination of both) were tested. The effects were estimated using binary logit model and a special regressor method. | Only the multi-channeled nutrition education approach had significant effects on the caregivers’ likelihood to retain OFSP on their farms. | Multi-channel education on OFSP through Early Childhood Development institutions can lead to sustained adoption. | Low |
| (Okello et al., 2019) | Kenya | households with children under 5 years, a pregnant or lactating women | 537 household surveyed and data analyzed with discrete choice regression | Intensive agriculture-nutrition education programs boost adoption and diffusion of biofortified crops. practical education events, mother-to-mother nutrition support, and nutrition-focused health talks positively affect OFSP adoption. Planting material preserved conservation cost over dry can decrease OFSP adoption chances. | Practical training-based, farmer education, and extension strategies lead to higher adoption rates. | Low |
| (Sakala et al., 2018) | Zambia | Rural household | 295 randomly selected households interviewed using a structured questionnaire during sweet potato harvest season to evaluate the association between OFSP consumption and household factors through χ2 tests. | OFSP consumption was found to be associated with having children under 5 in the household, producing OFSP, buying OFSP, and being knowledgeable about its health benefits. No significant association was found with household head's age, sex, or household size. | OFSP promotion efforts should center on increasing production and educating households on its nutritional benefits, with a focus on households with young children as the starting point. | Low |

**Table1** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Adekambi et al., 2020b) | Ghana | Farmers | 38 communities (13 in the Northern and 25 in the Upper East) was surveyed. 262 farmers were randomly selected for the study, using probability proportionate to size sampling technique. Data were collected via face-to-face interview. multivariate probit regression was used to analyze the data | Early maturity is the main reason of OFSP variety adoption. Individually, sweetness doesn’t affect OFSP adoption. The taste had negative effect in the OFSP variety model in comparison to local white variety model. adoption of OFSP variety is also impeded by the perception that it has low dry matter content. Farmer’s participation in training on agronomic practices relating to OFSP variety production, and in cooking demonstrations, increased its likelihood of adoption | Agronomical and organoleptic attribute significatively influence adoption of OFSP in Ghana. But in the regions surveyed, OFSP is produced principally due to its field performance, also famers training on OFSP production positively affect OFSP adoption and production | Low |
| (Jogo et al., 2021) | Mozambique | farmers | Survey on 1538 households randomly selected from 15 districts in Nampula and Zambezia provinces of Mozambique. Heckman bivariate probit model and seemingly unrelated (SURE) probit was used to analyze the data | Agronomic traits (yield, early maturity, drought tolerance) and access to planting material are particularly key for the retention of OFSP varieties. | Efforts are required to enhance the agronomic characteristics of biofortified OFSP so they are comparable to or better than local non-biofortified varieties, and to establish a seed distribution system to ensure sustainable adoption of biofortified OFSP. | Low |
| (Gilligan et al., 2020) | Uganda | farm households | Sample of 84 farmer groups from 3 districts (Kamuli, Bukedea, Mukono) Farmer groups sampled from list of active farmer groups, stratified by district Sample clusters are the farmer groups and households 48 farmer groups assigned to treatment group, 36 to control group. Spouses effect in OFSP adoption was estimated by equation using a logit specification | Adoption of OSP is not affected by women's control of assets in the household, land under joint control with women having primary control has a higher likelihood of having OFSP, women with higher bargaining power over household non-land resources are more likely to share OSP vines, no impact of women's bargaining power on children's Vitamin A intake seen. | Women's control over assets, especially non-land resources, positively impacts the adoption and diffusion of OFSP in households. Women with greater bargaining power are more likely to share OSP vines, resulting in higher OSP consumption. | Low |
| (Hendebo et al., 2022) | Ethiopia | farmers | 364 farmers of Sidama region of Southern Ethiopia interviewed, data were analyzed using descriptive statistics, multiple linear regression, and index grading. | Drought, lack of planting materials, diseases, and insect pests, were found to be the most significant challenges facing OFSP production in survey area based on the results of index ranking. | Adopt improved cultural practices for OFSP production, develop a cost-effective disease management strategy, focus on using planting bed types, such as sweet potato planting on ridges, use recommended spacing to achieve a good plant population, encourage farmer collaboration to increase OFSP production and consumption under resource-poor farmers. | High |

**Table1** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Okello et al., 2015) | Tanzania | Farmers | Multi-stage sampling technique used to survey 732 households in the Lake zone of Tanzania. both descriptive and exploratory factor analysis were used to analyses the data | Farmers have positive perception of OFSP: taste, yield, storability, disease resistance, popularity (among children), perceptions influenced by awareness and knowledge of OFSP, farmers who participated in project with OFSP sensitization have greater positive view of its nutritional value and popularity among children. | Farmers who received education on the health effects of Vitamin A deficiency and the role of OFSP as a source were more positively inclined towards OFSP. | High |
| (Mwiti et al., 2020) | Tanzania | Farmers | Multi-stage sampling technique used to select 481 farmers. | Farmers are eager to purchase OFSP vines, as shown by their willingness to pay a high price, but they are willing to pay a much higher price for non-biofortified varieties than for the biofortified ones. Attributes of sweet potato play a crucial role in the adoption of OFSP varieties. The adoption and consumption of OFSP is highly influenced by taste, which is considered a critical factor. | To improve OFSP adoption, efforts to educate farmers on nutrition and OFSP benefits and a focus on breeding OFSP varieties that are appealing in terms of taste are needed. | Low |
| (Kaguongo et al., 2012) | Kenya | Farmers | The study examines the adoption and intensity of adoption of orange flesh sweet potatoes (OFSP) by 340 farmers in Kenya. The study also investigated the impact of a value chain extension intervention program on the adoption of OFSP. Logit and transformed logit regression and a double-censored Tobit model was used for data analysis | District where the farmer came from, knowledge of value addition and nutritional benefits, and availability of vines were key factors for adoption of OFSP. It also found that participation in a value chain extension program increased the probability of adoption. Factors affecting the intensity of adoption included site, value addition, vines availability, level of commercialization, and having a child of up to five years. | Knowledge about the nutritional benefits of OFSP and participation in value chain extension programs are essential for enhancing the adoption and intensity of adoption of OFSP by farmers. | High |
| (Mudege et al., 2017) | Malawi | Household farmers | The study used sex-disaggregated focus group discussions (FGD) to understand the perceived benefits of cultivating and consuming OFSP. Two male and two female FGD facilitators were recruited, trained for three days on how to facilitate the FGDs, then an interview guide was used in order to obtain comparable information across groups. All interviews were recorded by a Chichewa native speaker who later transcribed them into written form. | The results of the study showed that more women's groups than men's groups stated that OFSP was good for bodies. Women often mentioned improved skin and health in their children, as well as better birth outcomes for pregnant women or improved weight for HIV positive people. Men were more likely to mention improvement in vitamin intake due to consuming OFSP. | OFSP can provide both economic and health benefits to farmers in Malawi. Farmers reported increased incomes from cultivating OFSP, as well as improved skin and health for their children due to consuming it. Additionally, women also mentioned other social impacts such as appreciation from husbands after introducing new sweet potato dishes into households. | Low |

**Table1** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Behrman, 2011) | Uganda | Farmers | A qualitative study conducted in 1594 households across three districts (Kamuli, Bukedea, and Mukono), clustered around 84 farmer groups. Fieldwork involved semi-structured Key Informant Interviews (KII) and Focus Group Discussions (FGD) with male and female members/non-members of farmer groups, exploring various aspects of OFSP adoption, household decision-making, and nutrition practices. | Training sessions highlighting the health/nutrition benefits and high yields of OFSP played a significant role in influencing individuals' initial decision to adopt OFSP. Health and nutrition benefits of OFSP were identified as a crucial factor in people's determination to continue cultivating it. OFSP vine's profitability and marketability contributed significantly to its sustained cultivation. Furthermore, its high yields were highly valued for enhancing food security. | The study revealed that men's and women's access to physical assets, human capital, and social capital played a complex and varied role in their likelihood to adopt and continue growing OFSP in Kamuli and Bukedea. The key themes that emerged regarding each type of asset were discussed throughout the focus group discussions and key informant interviews. | Medium |
| (Okello et al., 2017) | Tanzania | Farmers | The study used a dataset collected from 732 farm households in Tanzania to assess the effect of household food insecurity and benefit awareness on the adoption of OFSP varieties. | Household food security and awareness of the benefits of OFSP affect the decision to adopt OFSP varieties, and that agroecology and farmer endowment with financial and physical assets also influence the decision to grow OFSP varieties. | Efforts to combat vitamin A deficiency in poor developing-country households should focus on improving food security and increasing awareness of the benefits of OFSP, while also addressing issues related to agroecology and farmer endowment with financial and physical assets. | Medium |
| (Naico and Lusk, 2010) | Mozambique | Consumers | The study investigated consumers' willingness to consume new varieties of orange-fleshed sweet potatoes (OFSPs) relative to the traditionally consumed white sweet potato varieties in Mozambique. A choice experiment with nine choice questions was conducted in person with sweet potato shoppers. | Consumers value OFSPs with comparable eating quality to traditional varieties and are willing to pay more. Dry matter content is crucial, and orange flesh is preferred over white. The study recommends plant-breeding programs prioritize enhancing dry matter content in new orange flesh varieties to maximize nutritional benefits. | The study emphasizes the need for good eating quality in OFSPs, particularly concerning dry matter content, to boost adoption. Nutritional information, questioning format, and location (urban or rural) also influenced consumers' preferences for OFSPs. | Low |
| (Chowdhury et al., 2011) | Uganda | Consumer | The study used a choice experiment to estimate consumers' willingness-to-pay for biofortified beta-carotene-rich orange sweet potatoes (OSP) in Uganda, compared to traditional sweet potato varieties. Respondents tasted the varieties before the valuation, and valuations were incentive-compatible. | Consumers in Uganda are willing to pay for biofortified OSP as much as they are willing to pay for traditional white varieties. The impact of nutrition information was substantial, and consumers were willing to pay a premium for biofortified sweet potatoes when informed about the nutritional value. Taste factors were also important, and significant premiums and discounts were associated with tastes. | The success of biofortified OSPs relies on local marketplace profitability and consumer acceptance. Taste is crucial for acceptance, and nutrition information can lead to significant premiums for the biofortified variety. An information campaign with a premium could rapidly spread the deep-orange sweet potato variety. | Low |

OFSP = OSPs: orange fleshed sweet potato

**Table 2** Characteristics and findings of individual studies for Orange-Fleshed Sweet Potato (OFSP) values chain action in SSA

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Abidin et al., 2005) | Uganda | sweet potato varieties | Sixteen sweet potato varieties evaluated for yield in 20 trials over three seasons in four locations in Uganda from the year 2000 to 2001. The 11 varieties were obtained from participatory selection with farmers and 5 proposed by breeding program. The yield performance was quantified in terms of wide adaptation (genotypic mean across trials), specific adaptation (genotypic predictions for specific locations) and stability (Shukla stability variance) | two varieties were found to have broad adaptation and two others showed specific adaptation to certain growing conditions in northern and southern Uganda. These variety was among the 11 farmers variety evaluated. | The study found that using a participatory approach that involves farmers in the evaluation of sweet potato varieties can quickly identify promising genotypes, leading to improvement in sweet potato breeding. | Low |
| (Banda et al., 2021) | Uganda | Sweet potato Amyβ gene | 2.3 kb DNA fragment including Amyβ conserved region between exon V and VI region was sequenced from 25 sweet potato genotypes. | Six genotypes were identified, each with several SNPs within exon V and linked to an AT or ATGATA insertion in intron V, and were grouped together. The presence of a specific allele in the genotypes was associated with low gene expression and enzyme activity. Cooking roots that had lower enzyme activity showed higher firmness (R = -0.42). | Genetic differences obtained within the AmyB gene can be used to create markers that would aid in selecting sweet potato varieties with desired firmness in breeding programs. | Low |
| (Sseruwu et al., 2020) | Uganda | Sweet potato | Study conducted to select promising sweet potato F1 genotypes, considering farmer preferred traits, with 21 genotypes evaluated at 3 locations using randomized complete block design, evaluated by scientists and farmers for performance and quality before and after harvest | Higher total storage root yield was recorded at Namulonge. Five genotypes were the most stable for TRY and low levels of SPVD, and 5 genotypes were the most stable for low Alternaria blight. Positive and significant correlation between scientists and farmers mean ranking of the genotypes at each site. | Study identified 5 superior genotypes for further evaluation based on farmer preferred traits and showed successful selection through participatory approach. | Low |
| (Kulembeka et al., 2005) | Tanzania | Sweet potato | The study tested 7 varieties of sweet potato (5 orange-fleshed) from CIP over two seasons on farms in the Lake zone of Tanzania. | Orange varieties Zapallo, NC 1560 and Tainung No 64 produced high yields and were rated highly by farmers for agronomic performance. Sweet potato products made from orange varieties were preferred more by both adults and children. | The orange varieties and sweet potato products made from them were well received by both farmers and consumers. | Low |
| (Baafi et al., 2016) | Ghana | Sweet potato | One released variety and four introduced varieties as parents, and crossed them using the full diallel mating design | Significant genetic variation among the F1 hybrids and significant positive and negative heterosis was observed, but not adequate enough for the development of desired non-sweet, high dry matter, and high beta-carotene-rich varieties. 21 F1 hybrids were identified for further testing due to their comparable beta-carotene content and storage root yield, but lower sugar content than the released high-beta-carotene variety in Ghana. | Non-sweet, high dry matter and beta-carotene-rich genotypes that are preferred by farmers and consumers in Ghana were not identified | Low |

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Kivuva et al., 2015) | Kenya | Sweet potato | 84 sweet potato clones were evaluated for drought tolerance at two locations in Kenya from May 2011 to September 2012, A split plot design with drought stress and no drought stress conditions as whole plots, and clones as subplots was used, Data on growth and yield characteristics were recorded and analyzed. | Drought stress caused a reduction in yield and biomass but seemed to increase percent root dry matter and harvest index. Clones 194555.7, Unawazambane06-01, 189150.1, Tanzania, Chingova, W119, 441725, and Xiadla-xa-kau, had ≥75 days to permanent wilting point (DPWP), drought stress index (DSI) <1 and high fresh storage root yield under drought stress and no drought stress conditions. | Clones 194555.7, Unawazambane06-01, 189150.1, Tanzania, Chingova, W119, 441725, and Xiadla-xa-kau, may be used in a drought tolerance breeding program. | Low |
| (Mwanga et al., 2009) | Uganda | Sweet potato | Five cultivars were evaluated in on-station and on-farm trials across three agroecologies for resistance to various diseases and weevil damage, root yield, and other agronomic attributes | Cultivars had above-average root yields and performed as well as or better than local control cultivars in most cases. 'NASPOT 9 O' and 'NASPOT 10 O' had orange-fleshed storage roots with more provitamin A than cream-fleshed roots of other cultivars. | The released cultivars showed good resistance to resistance to SPVD, Alternaria stem blight and weevil damage, high root yields, and high acceptability on most farms. | Low |
| (Mwanga et al., 2007) | Uganda | Sweet potato | Two cultivars evaluated for important quality attributes, disease and insect pest reactions, and agronomic traits. The cultivars were tested for eight seasons on-station and on-farm in three different agroecologies. | Both cultivars have high root dry matter content, dry texture, and a sweet taste when cooked. They are potentially valuable sources of beta-carotene. 'SPK004' has moderate field resistance to SPVD, while 'Ejumula' is susceptible to the disease. Both cultivars are susceptible to sweet potato weevils, but 'SPK004' is less susceptible than 'Ejumula' under field conditions. | The cultivars are expected to perform well in agroecologies with low to moderate sweet potato virus disease (SPVD) pressure and with well-distributed rainfall for at least 3 months during growth. | Low |
| (Musembi et al., 2015) | Kenya | Sweet potato | Two studies were conducted on 15 F1 sweet potato families (G1-G15) using a half-diallel mating scheme of six parents to investigate the effects of drought stress on storage root yield, total biomass, harvest index, marketable number of storage roots, and root dry matter. | General combining ability (GCA) and specific combining ability (SCA) effects were significant for all traits under both drought stress and no drought stress conditions. Additive gene effects were more important than non-additive gene effects for storage root yield, harvest index, and root dry matter. | The progenies G8-8, G15-5, and G15-8 had the highest roots yield mid and best parent heterosis under drought stress, indicating that they may carry drought-tolerant genes. Drought-susceptible parents P3, P4, and P5 had the highest yielding crosses under drought stress, suggesting that they may carry drought-tolerant alleles that are homozygous recessive. | Low |
| (Ngailo et al., 2019a) | Tanzania | Sweet potato | 28 sweet potato families were evaluated in 3 field sites. They were generated from 8 selected genotypes using an 8x8 half diallel mating design. The evaluation was done using a 6x6 lattice design with three replications, and the GCA and SCA effects were evaluated for significant differences. | Significant GCA and SCA effects were found among the 28 sweet potato families, with environmental effects on gene action and expression. Five parental genotypes were identified as promising for sweet potato breeding to improve multiple traits. Additionally, three best-performing families were selected with high mean storage root yields, DMC, and resistance to SPVD. | The study showed that improved sweet potato clones could be developed by using diverse genotypes, and the identified parental genotypes and best-performing families are valuable in sweet potato breeding programs. | Low |

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Kagimbo et al., 2019) | Tanzania | Sweet potato | 6 weevils resistant and 6 susceptible parents crossed using a 6x6 factorial mating design, 36 families obtained evaluated at 3 locations using a 3x12 lattice design with 2 replications, weevil resistance, dry matter content, yield, and related traits of sweet potato clones were evaluated for GCA, SCA, gene action, and heritability | Significant GCA effect of females for all traits except PMRN and PMRY, Significant GCA effect of males for all traits except PMRY, Significant SCA effect of families for all traits, Additive gene action controlled more expression of TRN, RY, DMC, PIRN, PIRY, and WDS, 4 female parents and 4 male parents identified as the best general combiners, 13 families recorded the best performance for the evaluated traits | High heritability for most studied traits observed and presence of both additive and non-additive gene action. | Low |
| (Naidoo et al., 2021) | South Africa | Sweet potato | Two heterotic groups of five parents were crossed to generate 25 full-sib families, and nutrient content was determined using Near-Infrared Spectroscopy. Genetic control parameters were calculated, and significant interactions were found between female, male, and/or families with sites. | Female parents ‘199,062.1 × Ndou’ and ‘2012-8-4’ were the best general combiners for most of the nutrient traits, male parents ‘2003-8-1’ and ‘Khumo’ were the two best general combiners, several families had the highest specific combining ability for different nutrients in the two sites | High heterosis estimates were recorded for β-carotene content | Low |
| (Gurmu et al., 2018) | Ethiopia | Sweet potato | 7x7 half-diallel mating design with 28 genotypes evaluated at 4 locations in Ethiopia using a 7x4 alpha lattice design with 2 replications. | Progenies of crosses involving Ukerewe x Ejumula, Ukerewe x Pipi, Resisto x Pipi, and Ejumula x Pipi exhibited high levels of positive heterosis for storage root dry matter content (DMC). Crosses including Resisto x Pipi and Resisto x Ogansagan had higher positive heterosis for fresh storage root yield. Crosses with high β-carotene content such as Ukerewe x Resisto, Resisto x Ogansagan, Ejumula x Pipi, and NASPOT 1 x Temesgen exhibited high storage root DMC. | High β-carotene content crosses (Ukerewe × Resisto, Resisto × Ogansagan, Ejumula × Pipi, and NASPOT 1 × Temesgen) had high storage root DMC that exceeded the mean of the best parent. | Low |
| (Karanja et al., 2015) | Kenya | Sweet potato | Hand and polycrossing process performed on Thirty-six parent to generate a breeding nursery of 2200 seedlings. Multi-location trials were conducted on a randomized complete block design with three replicates at five sites under the oversight of the National Performance Trials committee. | Five new sweet potato varieties released (Kenspot-1 to Kenspot-5). The improved varieties have better average root yields (20 t/ha), moderate field resistance to SPVD and weevils, moderate dry matter content (26-32%), and consumer acceptability. | Through participatory breeding, production capacity of sweet potato at high altitudes has increased, providing food security, improving farmer adoption knowledge, market strategies, and food quality. Variety recommendation is agroecological specific. | Low |
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**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Gemenet et al., 2020) | Kenya | Sweet potato | 662 parents of International Potato Center's breeding program used, Low-density, highly informative SNP marker set for routine QA/QC (Quality assurance and control) developed, evaluation of the selected 30 SNPs in a recombined breeding population using 282 progenies. | 36-SNP set Developed a for QA/QC in sweet potato breeding SNP-set was confirmed to identify relatively similar mislabeling error rates as a high-density SNP-set of 10,159 markers | QA/QC is crucial for a breeding program's optimization efforts towards increased genetic gains. The developed low-density SNP marker set can be a cost-effective solution for routine QA/QC in sweet potato breeding programs. | Low |
| (Mwanga et al., 2002) | Uganda | Sweet potato | Ten parental sweet potato clones were crossed in a half diallel mating design to generate 45 full-sib families. The families were graft-inoculated with SPCSV and SPFMV to induce SPVD and evaluated for resistance in a randomized complete block design at two sites in Namulonge, Uganda during 1998–2000. | Significant effects for both general combining ability (GCA) and specific combining ability (SCA) for resistance to SPVD. Narrow-sense heritability and broad-sense heritability were moderate to high, indicating that rapid genetic gains for SPVD resistance could be accomplished by mass selection breeding techniques | Inheritance of resistance to SPVD in sweet potato is governed by additive gene effects and that mass selection breeding techniques could lead to rapid genetic gains for SPVD resistance. Two promising parents, New Kawogo and Sowola, identified for enhancement of SPVD resistance and recovery. | Low |
| (Shumbusha et al., 2019) | Rwanda | Sweet potato | Eight parents were hand-crossed in a half-diallel to generate 36 families, which were evaluated for root and vine yield components at three research stations in Rwanda. General combining ability (GCA) and specific combining ability (SCA), and heritability were calculated. | Additive gene action was more important than non-additive gene action for fresh root yield (FRY), root dry matter content (RDMC), dry root yield (DRY), root-to-vine ratio, harvest index (HI) and vine dry matter content. Heritability estimates were above 0.5 for all parameters, with FRY, HI and RDMC having the highest estimates. | Breeding for both improved storage root and vine yields in sweet potato for mixed crop-livestock farming systems is feasible, and additive gene action is more important for root and vine yield components. Identification of promising families and recommended progenies for future release. | Low |
| (Yada et al., 2017c) | Uganda | Sweet potato | Cross between 'New Kawogo' × 'Beauregard' sweet potato cultivars was evaluated for storage root yield, dry matter, starch, and β-carotene content. The study also identified SSR markers associated with these traits. | Broad sense heritability for storage root yield, dry matter, starch, and β-carotene content were 0.24, 0.68, 0.70, and 0.90, respectively. Storage root yield was positively correlated with dry matter and starch content, while storage root β-carotene content was negatively correlated with dry matter and starch content. | 12, 4, 6, and 8 SSR markers associated with storage root yield, dry matter, starch, and β-carotene content, respectively. | Low |
| (Yada et al., 2017a) | Uganda | Sweet potato | Bi-parental sweet potato population from a cross between moderately resistant 'New Kawogo' and highly susceptible 'Beauregard' was evaluated for SPW resistance and genotyped with SSR markers. Resistance has been associated with the presence of hydroxycinnamic acids esters (HCAs) | Moderate broad sense heritability was observed for weevil resistance in the population, and a weak but significant correlation was observed between total HCA ester concentration and SPW severity. | Markers IBS11, IbE5, and IbJ544b showed significant association with both field and hydroxycinnamic acids esters (HCAs) based resistance, representing potential markers for the development of SPW resistant sweet potato cultivars. | Medium |

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Yada et al., 2017b) | Uganda | Sweet potato | Bi-parental sweet potato mapping population was genotyped and phenotyped for sweet potato virus disease (SPVD) resistance at three sites and two seasons in Uganda to identify SSR markers associated with its resistance and understand its inheritance. | Seven SSR markers were significantly associated with SPVD resistance in this population, and the broad-sense heritability for SPVD resistance was 0.51. | Markers identified can be used to fine map the quantitative trait loci (QTL) of SPVD resistance for future implementation of marker-assisted selection (MAS) for SPVD resistance in sweet potato | Low |
| (Ngailo et al., 2019b) | Tanzania | Sweet potato | Evaluation of 23 newly bred sweet potato clones and 3 check varieties in six different environments in Tanzania to determine the genotype-by-environment interaction (GEI) for storage root yield, yield-related traits, and sweet potato virus disease (SPVD) resistance. | Both AMMI and GGE biplot analyses identified five promising sweet potato genotypes with high yields, high dry matter content, and SPVD resistance across all test environments. | Genotype, environment, and GEI effects were highly significant for the assessed traits. The identified promising genotypes can be recommended for further stability tests and release in Tanzania or similar environments. | Low |
| (Ebem et al., 2021) | Nigeria | Sweet potato | 41 sweet potato genotypes were evaluated across two diverse locations using a randomized complete block design with three replications. Data were collected on total number of roots per plant, number and weight of marketable roots per plant, fresh root yield, and root Cylas severity. The data were subjected to analysis of variance and stability analysis was conducted using GGE bi-plot. | Three promising sweet potato genotypes with high mean root yield and high stability (G13, G11, and G14) for fresh root yield and root Cylas severity were identified. | Genotypes identified can be utilized in a breeding program to improve local clones of sweet potato in Nigeria. | Low |
| (Gurmu et al., 2020) | Ethiopia | Sweet potato | 24 newly developed sweet potato clones and one check variety were evaluated across six diverse environments in southern Ethiopia to determine the effect of genotype-by-environment interaction (GEI) on nutritional composition of sweet potato clones using a 5x5 simple lattice design. | The study revealed significant genotype, environment, and genotype-by-environment interaction effects on the studied nutritional traits of sweet potato clones. | G5, G6, G12, G13, and G22 were selected for their high root dry matter content, protein, β-carotene, iron, zinc, starch, sucrose, fructose, and glucose contents. | Low |
| (Mwanga et al., 2016) | Uganda | Sweet potato | Sweet potato cultivars NASPOT 12 O and NASPOT 13 O were developed through Breeding and released by the Ugandan Plant Variety Release Committee. The cultivars were targeted for development of vitamin A-rich orange-fleshed sweet potatoes (OFSP) and evaluated for yield, root shape, dry matter content, consumer qualities, and disease resistance. | The cultivars have high average storage root yields, acceptable root shape, high dry matter content with good-to-excellent consumer qualities, and moderate levels of field resistance to sweet potato virus disease and *alternaria bataticola* blight. | These two cultivars have the potential to contribute to food and nutrition security in Uganda and other developing countries, especially where high dry matter and starchy sweet potatoes are preferred. They can also be used as parents in breeding programs to develop locally adapted cultivars. | Low |

**Table 2** (Continued)

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| --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Agili and Nyende, 2012) | Kenya | Sweet potato | Screening and selection of 18 Orange-Fleshed Sweet Potato (OFSP) genotypes for drought tolerance at two sites in Kenya using stress tolerance index and multidimensional preference analysis. | Six OFSP genotypes (194573.9, 420014, 440286, 189135.9, 187017.1 and 441725) showed high stress tolerance and yield potential compared to the check cultivars, indicating that screening and selection for OFSP drought tolerance is feasible | Six OFSP genotypes were identified as having high stress tolerance and yield potential, and yield potential and stress yield are the most desirable indices for screening drought tolerance genotypes. | High |
| (Kiiza et al., 2012) | Uganda | Sweet potato | Standard errors logit model to quantitatively assess the impact of participatory plant breeding (PPB) and participatory variety selection (PVS) on the adoption of improved sweet potato varieties (ISPV) in central Uganda. | Both PPB and PVS positively and significantly influenced the likelihood of adoption of improved sweet potato varieties, with farmers who participated in the plant breeding and variety selection processes being 37 and 6.7 times more likely to adopt the improved sweet potato varieties than those who had not, respectively. | PPB and PVS are effective methods for improving the adoption of improved sweet potato varieties, and extension services, training in sweet potato production, farming experience, and off-farm income of the household are other factors that positively influence adoption. Farmers who were trained specifically in sweet potato production were 8.8 times more likely to adopt the improved varieties than those who had not received this type of training. | High |
| (Gasura et al., 2021) | South Africa | Sweet potato | An on-farm study evaluated 14 orange-fleshed sweet potato varieties for yield, dry matter content, and sensory characteristics. Farmers in four environments evaluated the introduced varieties for acceptability. | Variety Cecelia was the top performer in three environments and Cecelia, Erica, Ininda, and Lourdes were the most stable and high-yielding varieties. Farmers accepted the dry matter content and taste of all introduced OFSP varieties | The introduced OFSP varieties are highly acceptable by farmers and could help combat vitamin A deficiency in sub-Saharan Africa. | Low |
| (Abebe et al., 2023) | Ethiopia | Sweet potato | The experiments were conducted in southern Ethiopia for two consecutive seasons (2017 and 2018) to evaluate the response of sweet potato genotypes to sweet potato virus disease (SPVD), resistant reactions, and storage root yield performance. Eight genotypes were used, and a randomized complete block design with four replications was employed. | NASPOT-13 and NASPOT-12 genotypes showed consistent resistance reactions and lower SPVD intensities. NASPOT-13 consistently provided a higher storage root yield across the locations in the two cropping seasons, making it a suitable variety for sweet potato production in the study areas and elsewhere with similar agro-ecological conditions. | NASPOT-13 and NASPOT-12 can be used as a source of parent material for SPVD-resistant genotype development in sweet potato breeding programs. | Low |

**Table 2** (Continued)

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| --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (ANDRADE et al., 2017) | Mozambique | Sweet potato | An accelerated breeding scheme was used to select high-yielding and well-adapted orange-fleshed sweet potato (OFSP) cultivars with high β-carotene (BC) content. More than 198,500 seeds were germinated and rapidly multiplied for evaluation in observation trials at four breeding locations in Mozambique. | 64 high-yielding OFSP breeding clones were selected and evaluated in four mega-environments. The proposed ABS seems to be an attractive scheme for genetic enhancement of sweet potato. | The ABS is an efficient breeding scheme for selecting high-yielding and well-adapted OFSP cultivars with high β-carotene content | Low |
| (Nakitto et al., 2022) | Uganda | Sweet potato | 12 advanced genotypes and 101 additional samples were evaluated in two trials using DSA and instrumental texture analysis. In on-farm trials, 7 genotypes underwent DSA, instrumental texture analysis, and consumer acceptability tests. | The established sweet potato lexicon enabled differentiation of genotypes by sensory profiles, and a minimum texture value of 3700 gf was proposed for screening sweet potato genotypes. | Combining DSA with instrumental texture analysis can efficiently screen genotypes in sweet potato breeding programs and prioritizing end-user preferred traits could improve adoption rates of released genotypes. | Medium |
| (Namanda et al., 2013) | Uganda, Tanzania | Farmers | Testing of different methods for improving sweet potato vine cuttings, including planting depths, watering schedules, and storage conditions. Validation of the Triple S method in the Lake Zone of Tanzania. | Preference for vine cuttings from plants maintained during the dry season in a swamp or by irrigation. Roots planted 10 cm deep and watered for 10 weeks before the start of the rains produced the best results. Roots stored in dry sand in a roofed building showed high survival rates and prolific sprouting. | The Triple S method provides farmers with early and healthy planting material with minimal watering requirements, offering convenience and ownership | Low |
| (Fuglie, 2007) | 29 developing countries (SSA and other) | scientists | Survey conducted by the International Potato Center (CIP) to identify constraints and priorities for sweet potato improvement. Scientists ranked productivity constraints based on their regional importance. Mean and weighted mean scores were calculated to determine the most critical constraints. | Key needs identified for sweet potato growers in developing countries, including virus control, small-enterprise development for processing, improved planting material availability, and high-yield cultivars. Priority differences observed between sub-Saharan Africa and China, with additional needs in Africa for weevil control and high β-carotene content cultivars. China emphasized genetic resource conservation, prebreeding, high starch yield cultivars, and new product development. | Priorities for sweet potato improvement vary by region, reflecting differences in the crop's economic importance and research capacities. There is a growing need for postharvest utilization research, particularly in sub-Saharan Africa, due to the crop's status as an inferior food. | Low |

Amyβ: β-amylase gene, SNP: single nucleotide polymorphism, F1: first generation genotypes, TRY: total root yield, SPVD : sweet potato virus disease, CIP: Centro Internacional de la Papa (International Potato Center), GCA: general combining ability, SCA: specific combining ability, PMRN: percentage marketable root number, PMRY: percentage marketable root yield, TRN: root number, RY: root yield, DMC: dry matter content, PIRN: percentage infested root number, PIRY: percentage infested root yield, WDS weevil damage score, QA: quality assurance, QC: quality control, HCA: hydroxycinnamic acids esters, SPW: sweet potato weevil, SSR: simple-sequence repeat, AMMI: Additive Main Effect and Multiplicative Interaction, GGE: genotype and genotype-by-environment, PPB: participatory plant breeding, PVS: participatory variety selection, ABS: accelerated breeding scheme, DSA: descriptive sensory analysis, TPA: texture profile analysis.

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Gatto et al., 2023) | Malawi | Farmers | Analyzed direct and spillover effects of ANIs on sustained household outcomes, including OFSP adoption, area planted, harvest, and sales. Utilized bivariate probit, instrumental variables, and propensity score matching techniques for analysis. | Spillover effects from OFSP interventions benefited non-participants in treatment villages. Key diffusion mechanisms for OFSP adoption included vine multipliers and vine conservation techniques. Interventions promoted higher OFSP root sales, indicating income generation as a significant motivator for adoption, alongside own-consumption. OFSP root sales served as an overlooked mechanism for reaching additional farmers beyond direct participants | Designing ANIs with both supply-push (e.g., vine multipliers, conservation techniques) and demand-pull components (e.g., participatory varietal selection, agronomic training) is crucial. | Low |
| (Mudege et al., 2018) | Malawi | Farmers, extension workers | data was collected from focus group discussions and individual interviews with farmers and extension workers. | Gender biases in farming training overlook women, hindering their adoption of sweet potato technologies. Institutional contexts marginalize women, limiting their ability to fully utilize advancements. Restricted access to resources like land and labor further impedes women's adoption. Increased workload from vine multiplication may discourage continued use. | Scaling strategies must encompass technical and non-technical facets of agriculture for women's full benefit from improved technologies. Adapting technology implementation to the physical and institutional context is vital, ensuring both genders adopt and profit from it. | Low |
| (Chah et al., 2020) | Nigeria | Farmers | Employed multistage sampling to select sixty farmers, half adopters and half non-adopters. Utilized participatory tools for data collection and analyzed using descriptive statistics. | Majority of both adopters and non-adopters were male. Adopters were older, more educated, with larger farms, higher incomes, and better access to extension services and credit. Adopters had higher knowledge levels of OFSP. Main adoption motivations were taste and profitability, rather than health benefits. Non-adopters cited complexity of production techniques and high costs of OFSP vines and roots. | Extension agents should intensify sensitization efforts and provide education about OFSP to farmers. Research institutes should strive to ensure the availability and accessibility of inputs, particularly vines and planting materials, to encourage more farmers to cultivate vitamin A-rich OFSP | Low |
| (Fofanah, 2016) | Ethiopia | Children aged 6-59 months, pregnant and lactating women | International Potato Center (CIP) is piloting a food-based strategy promoting the production and consumption of orange-fleshed sweet potatoes (OFSP) in Tigray. | Key messages aim to raise awareness of VAD, educate on the nutritional value of OFSP, and mobilize communities for increased production and consumption. | The success of the intervention relies on strong partnerships with community-based organizations, health workers, schools, and religious leaders to ensure widespread adoption and sustainability. | Medium |
| (de Brauw et al., 2018) | Mozambique and Uganda | Farmers | Randomized field experiments conducted in both Mozambique and Uganda to promote the adoption of biofortified OFSP. Causal mediation analysis was employed to examine the pathways through which adoption and dietary intakes were influenced. | Project achieved similar impacts in both countries, with 61% to 68% adoption rates among exposed farmers and doubled vitamin A intakes in children. Two intervention models with varying training intensity had comparable impacts. Increased nutrition knowledge minimally affected adoption, but adoption significantly increased vitamin A intakes, particularly in Uganda | Despite differing agronomic conditions, project achieved comparable impacts in both countries. Increased vitamin A intakes primarily driven by adoption rather than nutrition knowledge. Simplifying nutrition trainings could achieve similar impacts. | Low |

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Hotz et al., 2012) | Uganda | farmer children aged 6–35 months, children aged 3–5 years, and women. | Implemented two large-scale, 2-year intervention programs to promote the production and consumption of orange sweet potato (OSP). The programs, one intensive (IP) and one reduced (RP) in the second year, were compared with a control group through a randomized, controlled effectiveness study. | Both the IP and RP groups showed increased OSP intake, contributing significantly to vitamin A intake. No significant differences were observed between IP and RP groups for children or women. A reduction in the prevalence of low serum retinol levels was observed among children in the IP group. | Introduction of OSP to Ugandan farming households led to increased vitamin A intakes among children and women, along with improved vitamin A status among children. | Medium |
| (Moyo et al., 2022) | SSA | Smallholder farmers, including women and youths | Replacing some wheat flour with OFSP puree in bread and pastries; private companies manufacturing and selling puree to bakeries; utilizing food safety protocols; employing Scaling Readiness approach | Successful substitution of up to 40% of white wheat flour with OFSP puree in bread and other baked goods; consumers like the products; profitability of processing puree indicated by business models | The utilization of OFSP puree presents economic opportunities for smallholders, including women and youths, by increasing market demand for nutritious varieties. The technology for making sweet potato puree has been well developed and can be effectively applied in various countries. | Low |
| (Girard et al., 2021) | Kenya, Tanzania, Mozambique, and Ethiopia | Pregnant, lactating women, infants, children | Multisectorial strategies were employed, integrating agriculture with health or education sectors. | Significant increases in OFSP production were observed in households across the projects. Improved food security and maternal and child diets were reported in all but one project. | Integrated strategies across agriculture, health, or education sectors effectively distribute and fulfill OFSP's role in addressing vitamin A deficiency in sub-Saharan Africa. | Low |
| (Adetola et al., 2020) | Nigeria | Infants and young children at risk of deficiencies in vitamin A, zinc, and iron. | Development and evaluation of two nutritionally balanced sweet potato-based complementary foods (OFSP-CFs) containing locally available products. | OFSP-CFs had higher levels of protein and fat compared to a commercially cereal-based product (Control). Met stipulated values for energy, protein, and fat as specified in the Codex standards. Higher levels of vitamin A and zinc compared to the Control. OFSP-CF2 had the highest iron content among the formulations. | OFSP-CFs can effectively improve the intake of vitamin A, zinc, and iron in infants and young children, potentially reducing deficiencies and protein-energy malnutrition in Nigeria and other developing countries. | Medium |
| (Wangithi et al., 2023) | Kenya | Men and women consumers | Following a multistage sampling technique, authors employed the Becker–DeGroot–Marschak (BDM) experimental auction method to assess men and women consumers willing to pay for OFSP puree products | Limited awareness of OFSP and OFSP puree products among men and women. Both men and women were willing to pay a premium for OFSP puree products. Women showed a higher willingness to pay for OFSP puree products compared to men. Gender, age, education, knowledge of OFSP puree products, income category, availability of nutritional information, and reference pricing were significant determinants of willingness to pay. | OFSP puree products have potential market demand among low- and middle-income households in Kenya. Women demonstrate a higher willingness to pay for these products. Greater consumer education and awareness efforts are needed to increase uptake, particularly among men. | Low |

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Bocher et al., 2019) | Rwanda | 946 participants randomly chosen, including 384 females and 562 males. | Structured survey and taste tests administered to participants. Analysis included ranking attributes of different juices and the use of statistical models such as the Heckman two-stage probit model and multinomial logit model. | Biofortified foods like OFSP juice combat vitamin A deficiency cost-effectively. We studied consumer preferences and willingness to pay for it. Attributes like aroma, taste, color, sugar, and aftertaste were ranked. Gender, buying frequency, aroma, taste, and vitamin A knowledge influenced willingness to pay and choice. Nutritional info boosted both willingness to pay and choice for OFSP juice. | Nutrition information plays a crucial role in influencing consumer acceptance and willingness to pay for OFSP juice. Biofortified foods like OFSP juice offer a promising solution to address micronutrient malnutrition in developing countries like Rwanda. | Low |
| (Owuor et al., 2023) | Kenya | 411 sweet potato consumers in rural and urban areas of Kenya | Contingent valuation method used to examine consumers’ preference for OFSP puree chapati. Data collected through random sampling. Double-bounded logit model applied to analyze consumers’ willingness to pay (WTP) | Consumers were willing to pay KES 19 (USD 0.14) and KES 35 (USD 0.26) for OFSP puree chapati in Homa Bay and Nairobi counties, respectively. Factors positively and significantly influencing WTP included the presence of children under 5 years old in a household, consumers’ awareness of OFSP products and benefits, and level of education. | Consumers exhibited a positive preference for OFSP puree chapati. Promoting consumer awareness through cooking demonstrations and engaging platforms like social media could increase consumption of OFSP and its value-added products in Kenya. | Low |
| (Shee et al., 2019) | Uganda | Smallholder farmers in two districts in Uganda | Cross-sectional field survey data used to assess determinants of postharvest losses at each stage of maize and sweet potato value chains. Ordered probit model estimation applied to analyze self-reported perceptions of postharvest losses. | Increased years of education and training in postharvest management correlated with lower perceived levels of postharvest losses. Lower perceived losses associated with specific practices: Transport, Drying, Shelling, Storage | Comprehending postharvest loss determinants is vital for implementing effective mitigation strategies. Education, training, and better handling practices notably decrease perceived postharvest losses in maize and sweet potato value chains among Ugandan smallholder farmers. | Low |
| (Stathers et al., 2015) | Sub-Saharan Africa (SSA) | Young children under five years of age and women of reproductive age in SSA | Advocating for more investment in OFSP to tackle vitamin A deficiency among children and women. Building institutional capacity for gender-sensitive projects promoting OFSP access in SSA. Producing OFSP investment guides to aid investors and project implementers in understanding investment opportunities and processes. | Research indicates that combining agricultural interventions with nutrition and behavior change communication leads to higher adoption rates and increased vitamin A intake. OFSP investment guides, including an investment guide, implementation guide, and summary, have been developed to assist investors and project implementers. | Investment in OFSP is crucial for combating vitamin A deficiency and hunger in SSA. The OFSP investment guides aim to inspire program implementers and attract financial support to address these pressing nutritional challenges. | Medium |

**Table 2** (Continued)

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| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (CIP, 2019) | Kenya | Sweet potato farmers and researchers involved in storage trials. | Construction of two evaporatively cooled stores, one run on mains power and the other on solar. Evaluation of storage conditions and performance through temperature monitoring and storage trials. Construction of a solar-powered standard refrigeration store. Evaluation of storage conditions and performance of the refrigeration store through temperature monitoring and storage trials. Investigation of factors affecting sweet potato root storability. | Evaporatively cooled stores preserved a significant percentage of sweet potato roots for puree production after 4 months of storage. Solar-powered refrigeration store reduced sprouting and weevil infestation but resulted in higher rotting of stored roots. De-haulming prior to harvest improved root storability. | Evaporatively cooled stores and solar-powered refrigeration stores show promise for preserving sweet potato roots. Further research is necessary to optimize storage conditions to minimize postharvest losses. | Low |
| (Hudson et al., 2017) | Ethiopia, Malawi, Tanzania, Uganda | Smallholder farmers | Surveyed purposefully selected communities within radio station coverage areas. Compared listening vs. non-listening households due to difficulty in identifying true controls. Covered 26 communities across four countries. Focused survey on knowledge, uptake of promoted practices, and radio program quality. Interviewed 1931 respondents using structured survey instrument. Utilized one-tailed z-test to compare listening and non-listening households. | Radio campaigns utilizing both listening groups and ICTs were effective in engaging African farmers and increasing awareness and adoption of agricultural practices. Research findings suggest that the participatory approach positively impacted listenership, knowledge, and initial adoption of agricultural techniques presented in the radio campaigns. | The findings of the research on participatory radio campaigns could be highly relevant for increasing awareness and adoption of agricultural practices in Sub-Saharan Africa. | Low |
|  |  |  |  |  |  |  |
| (Sugri et al., 2017) | Ghana | Sweet potato farmers and stakeholders in the sweet potato value chain | Conducted regional study to enhance sweet potato value chain. Employed mixed methods including face-to-face interviews. Conducted SWOT analysis at multistakeholder platforms. Determined gross margin profit and benefit-cost ratios | Sweet potato production in Northern Ghana primarily targeted food vendors, processors, wholesalers, retailers, and household consumers. SWOT analysis revealed opportunities including favorable production ecologies, processing options, and high demand in local and international markets. Identified production constraints such as limited access to seed, high cost of chemical fertilizer, short shelf-life, field pests and diseases, and declining soil fertility. | Collaboration among institutional actors is essential to synergistically operate with a collective profit motive. Addressing prioritized production constraints, including improving seed access and soil fertility, is crucial for enhancing the sweet potato value chain in Northern Ghana. | Low |

**Table 2** (Continued)

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| --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Country** | **Population** | **Methodology** | **Results** | **Conclusion** | **Risk of bias** |
| (Sugri et al., 2017) | Ghana | Sweet potato farmers and stakeholders in the sweet potato value chain | Conducted regional study to enhance sweet potato value chain. Employed mixed methods including face-to-face interviews. Conducted SWOT analysis at multistakeholder platforms. Determined gross margin profit and benefit-cost ratios | Sweet potato production in Northern Ghana primarily targeted food vendors, processors, wholesalers, retailers, and household consumers. SWOT analysis revealed opportunities including favorable production ecologies, processing options, and high demand in local and international markets. Identified production constraints such as limited access to seed, high cost of chemical fertilizer, short shelf-life, field pests and diseases, and declining soil fertility. | Collaboration among institutional actors is essential to synergistically operate with a collective profit motive. Addressing prioritized production constraints, including improving seed access and soil fertility, is crucial for enhancing the sweet potato value chain in Northern Ghana. | Low |
| (Annette et al., 2023) | Eastern Africa Region (EAR) | Small-medium food enterprises (SMEs) in the Eastern Africa Region | Tailored Business Development Services (BDS) for selected SMEs in EAR | The SMEs identified numerous opportunities and entry points for OFSP value chain development and expansion through the BDS depending on their business needs. | There is a need to engage and support SMEs in tailoring business models suitable for their scaling needs along the OFSP value chain to make available in the market, affordable nutrient-dense OFSP-puree products. | Medium |
| (Etwire et al., 2023) | Ghana | Men and women farmers | Collected data from men and women farmers in 300 households. Analyzed the proportion of farmers applying good agricultural practices after participating in a demonstration and seeing a video or otherwise. Assessed the ratio of men and women farmers using sand storage and sprouting technology among unexposed and exposed farmers to different communication channels. | Higher proportion of farmers applied good agricultural practices after participating in a demonstration (and also seeing a video or otherwise). Ratio of men and women farmers using sand storage and sprouting technology was lowest among unexposed farmers and highest among farmers exposed to both video and demonstration. | Multi-channel communication is more effective in influencing the knowledge, attitudes, and practices (KAPs) of farmers than individual channels. | Low |
| (Waized et al., 2015) | Tanzania | Sweet potato farmers | Data from an end-line survey conducted to assess the Scaling Sweet Potato Triple S PLUS project was used. The survey employed simple random sampling to select districts and communities for enumeration. Smartphones with Open Data Tool Kit were used to administer survey instruments to household heads and spouses. Descriptive statistics and the Kruskal–Wallis test were employed for data analysis. | Interventions have not led to widespread uptake of OFSP among farming households. Challenges include limited awareness and demand among consumers, lack of commercially viable value chains, and insufficient focus on coordinated support systems. | The study underscores the importance of developing support systems at various stages of the value chain for successful introduction of biofortified crops like OFSP. It emphasizes the need for strategic coordination among stakeholders to foster commercial opportunities, create demand through awareness campaigns, and address barriers to acceptability. | Low |
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**Table 3:** **Inclusion and exclusion criteria for the selection of SO1 studies, factors influencing OFSP adoption in SSA**

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| --- | --- | --- | --- | --- |
| **Criteria** | **Included** | **Excluded** | **Screening phase applied** | **Relevance** |
| Geographical relevance | Studies conducted in sub-Saharan African countries | Studies conducted outside of sub-Saharan African countries | Title, Abstract, Full text | Limiting the scope to sub-Saharan African countries ensures the focus on the specific region of interest for the study. |
| Topic related to OFSP adoption factors | Research papers that have a clear objective of identifying the key factors contributing to the adoption of orange-fleshed sweet potato | Studies that do not analyze the factors contributing to the adoption of orange-fleshed sweet potato. | Title, Abstract, Full text | Studies that have a clear objective of identifying the key factors contributing to the adoption of orange-fleshed sweet potato ensures that the studies are relevant and provide useful information. |
| Publication quality | Peer-reviewed empirical studies, gray literature. | Meta-analyses and/or narrative reviews, study protocols, conference abstracts | Title, Abstract | Studies that have undergone peer review are generally considered to be of higher quality in terms of content and methodology. Therefore, studies that have not undergone peer review will be excluded. Additionally, meta-analyses or narrative reviews were excluded because they do not provide detailed insights on the empirical articles. |
| Language | English |  | Title | Limiting the review to articles published in English allows for efficient comprehension and analysis by the researchers. |
| Publication years | From 2000 |  |  |  |
| Study evaluation method | Research papers with a clear study design and evaluation method. | Research papers with not appropriate study methodology to identified OFSP adoption factors. | Abstract, Full text | Validated data collection tools and methods ensures that the data collected is accurate and reliable. The inclusion of studies that report the statistical analysis used to analyze the data ensures that the results are more reliable. |

**Table 4: Inclusion and exclusion criteria for the selection of SO2 studies, OFSP value chain action in SSA**

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| --- | --- | --- | --- | --- |
| **Criterion** | **Included** | **Excluded** | **Screening phase applied** | **Relevance** |
| Geographical relevance | Studies conducted in sub-Saharan African countries | Studies conducted outside of sub-Saharan African countries | Title, Abstract, Full text | Limiting the scope to sub-Saharan African countries ensures the focus on the specific region of interest for the study. |
| Topic related to OFSP genotypes evaluation | Research papers that analyze the implications of adoption factors for increased OFSP production, breeding programs, value chain development, marketing strategies, or commercialization efforts | Studies that do not explore the implications of adoption factors for OFSP production, breeding, or commercialization | Title, Abstract, Full text | Some study did not tackle directly OFSP crop production aspects |
| Publication quality | Peer-reviewed empirical studies, gray literature. | Meta-analyses and/or narrative reviews, study protocols, conference abstracts | Title, Abstract | Studies that have undergone peer review are generally considered to be of higher quality in terms of content and methodology. Therefore, studies that have not undergone peer review will be excluded. Additionally, meta-analyses or narrative reviews were excluded because they do not provide detailed insights on the empirical articles. |
| Language | English |  | Title | Limiting the review to articles published in English allows for efficient comprehension and analysis by the researchers. |
| Publication years | From 2000 |  |  |  |
| Study evaluation method | Research papers with a clear study design and evaluation method, validated data collection tools, and appropriate statistical analysis | Research papers with inappropriate study methodology or lack of statistical analysis for evaluating implications of adoption factors | Abstract, Full text | Studies that report clear adoption and introduction effort methodology ensures that the studies are relevant and provide useful information for your review. |

**Table 5: Modified checklist derived from the critical Appraisal Skills programme (CASP) for qualitative studies**

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| 1. Was there a clear statement of the aims of the research? |
| 2. Is a qualitative methodology appropriate? |
| 3. Was the research design appropriate to address the aims of the research? |
| 4. Was the recruitment strategy appropriate to the aims of the research? |
| 5. Was the data collected in a way that addressed the research issue? |
| 6. Have ethical issues been taken into consideration? |
| 7. Was the data analysis sufficiently rigorous? |
| 8. Is there a clear statement of findings? |
| 9. How valuable is the research? |

**Table 6: Modified checklist derived from the critical Appraisal Skills programme for randomized controlled trials (CASP)**

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| 1. Was the study question or objective clearly stated? |
| 2. Was the study design appropriate for the research question? |
| 3. Were the OFSP genotypes evaluated/concerned in the study? |
| 4. Were the outcome measures clearly defined and valid? |
| 5. Were the statistical methods appropriate? |
| 6. Were the results presented clearly and accurately? |
| 7. Were the conclusions supported by the data? |

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