MARKET INFORMATION ACCESS AND WOMEN'S PARTICIPATION IN IRISH POTATO MARKETING: A STRUCTURED NARRATIVE REVIEW

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Abstract. Women contribute substantially to potato production and post-harvest handling, yet they often enter markets with less information, weaker bargaining positions, and fewer productive assets than men. This structured narrative review examines how access to price, demand, buyer, quality, logistics, and risk information shapes women's participation in Irish potato marketing. Literature published between 2000 and 2025 was identified from major academic databases, Google Scholar, and institutional repositories. Potato-specific studies were prioritized, while broader evidence from smallholder agriculture and digital extension was used only to explain mechanisms where direct evidence was limited. The evidence indicates that market information can improve sales timing, market selection, price negotiation, and coordination of storage and transport. However, information availability alone is insufficient. Benefits depend on women's control of communication devices, literacy, mobility, time, working capital, group membership, and the reliability and actionability of the information received. Mobile platforms can widen reach, but radio, extension agents, and farmer organizations remain important for women with limited connectivity. Direct evidence on marketing intention is sparse; most studies measure access, use, commercialization, or participation and rely on cross-sectional designs. Causal claims should therefore be made cautiously. The review proposes a capability-based pathway in which information contributes to market participation only when women can access, understand, trust, and act on it. Policies should prioritize blended communication channels, local-language and voice-based services, gender-responsive extension, collective marketing, verified buyer networks, and links to storage, transport, finance, and risk-management services.

Keywords: *digital agriculture, gender, Irish potato, market information, market participation, smallholder farmers*

Introduction

Potato is an important food and cash crop in many low- and middle-income countries. Its short production cycle, high yield potential, and diverse food and processing use make it attractive to smallholder households, while its perishability and exposure to price fluctuations create significant marketing risks (Wakaba et al., 2022; Birch et al., 2012). In East Africa and parts of West Africa, women contribute labour to production, sorting, storage, retailing, and other post-harvest activities. Their contribution, however, does not always translate into equal influence over sales decisions, control of income, or access to profitable market outlets (Wamuyu, 2019; Mudege et al., 2015). Market information refers to data and practical knowledge that help farmers decide what quality and quantity to sell, where and when to sell, whom to sell to, and how to transport, store, grade, or negotiate the product. It includes current

and expected prices, buyer requirements, demand conditions, market locations, quality standards, transport costs, storage options, and the trustworthiness of potential trading partners. Access is more than exposure to a message. Farmers must be able to obtain, understand, assess, and use information in a decision that improves their position (Magesa et al., 2020). Women often face gender-specific constraints at each stage of this process. They may have less control over mobile phones, cash, land, transport, and time; lower access to extension meetings; and weaker representation in producer organizations and buyer networks. Household responsibilities and mobility restrictions can also limit visits to distant markets or participation in training. These conditions can reduce both the quantity of information available to women and their ability to act on it (Adebayo and Worth, 2024; Adegbite and Machethe, 2020; Mudege et al., 2020).

Digital platforms, mobile phones, radio, video-based extension, and farmer-group communication have increased the number of ways through which agricultural information can be delivered. Studies of digital marketing and extension show clear potential, but also demonstrate that adoption is uneven and depends on connectivity, affordability, design, trust, and support from extension or peers (Gumbi et al., 2023; Coggins et al., 2022; Emeana et al., 2020). In Kenya, access to and use of the M-shamba platform among potato farmers varied with age, income, farming experience, extension access, household characteristics, and the gender of the marketing decision-maker (Maina et al., 2023). More recent evidence also links the use of information and communication platforms with gender gaps in potato productivity, although it does not establish that information alone causes improved outcomes (Wayagi et al., 2025). The existing literature therefore supports a more careful question than whether market information is beneficial. The key issue is when, through which channels, and under what social and economic conditions information strengthens women's market participation. This review synthesizes the evidence on those mechanisms, separates direct potato-specific findings from supporting evidence in smallholder agriculture, and identifies practical and research priorities. It also clarifies a central limitation in the literature: women's marketing intention is rarely measured directly. Most studies examine access, use, commercialization, participation, productivity, or perceptions, including recent empirical work in Plateau State, Nigeria (Goshit et al., 2025).

Materials and Methods

Design and scope

A structured narrative review was used because the available literature is heterogeneous in setting, method, exposure, and outcome, and because the source manuscript did not contain the screening counts, protocol registration, or study-level quality scores required for a full systematic review. A structured narrative approach allows transparent searching and evidence classification without making an unsupported claim of exhaustive retrieval (Snyder, 2019). The review focuses on literature published from 2000 to 2025 and uses the term Irish potato to refer to Solanum tuberosum where this terminology is common.

Information sources and search terms

The literature was identified through Scopus, Web of Science, PubMed, JSTOR, Google Scholar, and relevant institutional repositories. Search concepts combined

potato terms ("Irish potato", potato, or "Solanum tuberosum") with gender terms (women, female, or gender) and market terms ("market information", "market access", commercialization, "market participation", "digital marketing", mobile, ICT, extension, radio, platform, price, buyer, storage, or transport). Reference lists of relevant reviews and potato value-chain studies were also examined. Only English-language sources were considered.

Eligibility and evidence classification

Evidence was classified in two levels. Direct evidence included potato-specific studies that examined market information, market participation, commercialization, marketing decisions, digital platforms, or gendered value-chain participation. Contextual evidence included studies of women or smallholder farmers in other agricultural sectors when they directly explained a mechanism relevant to information access, digital extension, bargaining, or market inclusion. Studies unrelated to agriculture, market decisions, information access, or gender were excluded. Evidence from sweet potato, non-agricultural marketing, monetary policy, health communication, and unrelated technology applications were not used (*Table 1*).

Table 1. *Eligibility framework and role of supporting evidence.*

Evidence level	Required focus	Typical outcomes	Role in the review
Direct potato evidence	Potato production or marketing, with market information, commercialization, participation, digital platforms, or gender analysis.	Information access/use, sales decisions, market participation, commercialization, productivity, bargaining, or perceived intention.	Primary basis for conclusions about potato markets.
Contextual agricultural evidence	Smallholder or women farmers and a clearly relevant information, extension, digital, finance, or market-access mechanism.	Technology use, information capability, extension reach, empowerment, or market outcomes.	Used to explain mechanisms where potato-specific evidence is sparse.
Excluded evidence	No agricultural market link; no information or participation mechanism; unrelated crop or technology without transferable relevance.	Outcomes outside the review question.	Removed to prevent topic drift and unsupported generalization.

Synthesis and appraisal

Studies were compared by setting, design, sample, gender treatment, information channel, and outcome. Greater weight was given to peer-reviewed empirical studies with clear samples and measures, sex-disaggregated analysis, and direct relevance to potato marketing. Cross-sectional associations were not interpreted as proof of causality. The synthesis also distinguished information availability from effective use, because receiving a message does not show that the recipient understood it, trusted it, or had the resources to act.

Results and Discussion

Profile and strength of the evidence

Direct evidence is limited and geographically concentrated, especially in Kenya, Tanzania, Malawi, Uganda, and Nigeria. Most studies use household surveys, regression models, qualitative interviews, or mixed methods. They provide useful evidence on associations and mechanisms, but few isolate the effect of market information from production scale, extension contact, group membership, household

wealth, distance to market, or gendered control of resources. Experimental evidence is more common in general agricultural extension than in potato marketing (Lecoutere et al., 2023) (*Table 2*).

***Table 2**. Selected direct evidence relevant to women, information, and potato marketing.*

Study	Setting and design	Main focus	Contribution to this review
Maina et al. (2023)	375 potato farmers, Nakuru County, Kenya; survey and Heckprobit model.	Access to and use of the M-shamba digital marketing platform.	Platform access and use depended on income, experience, extension contact, household factors, and gender of the marketing decision-maker.
Wakaba et al. (2022)	388 potato-producing households, Nyandarua County, Kenya; commercialization index and Tobit model.	Extent and determinants of commercialization.	Knowledge, group membership, production scale, transaction costs, and household characteristics shaped commercialization.
Wamuyu (2019)	Kinangop Sub-County, Kenya; interviews, focus groups, oral testimony, and key informants.	Gender roles and participation across the potato value chain.	Women faced weaker control over land, credit, training, decisions, and income.
Mudege et al. (2015)	Potato farmer groups in Malawi; qualitative, sex-disaggregated group research.	Collective action and women's empowerment.	Group structures can support market access, but household and organizational gender relations affect who benefits.
Daniel et al. (2018)	Njombe and Wanging'ombe, Tanzania; econometric analysis of market participation.	Determinants of participation in Irish potato marketing.	Market participation reflected household resources, transaction conditions, and value-chain opportunities rather than information alone.
Akello et al. (2022)	Smallholder potato farmers in eastern and southwestern Uganda; quantitative analysis.	Choice of storage technologies.	Storage decisions influence when farmers can sell and whether price information can be acted upon.
Goshit et al. (2025)	350 women in Plateau State, Nigeria; survey and factor analysis.	Perceptions of participation in Irish potato marketing.	Market access, market form, experience, information, and intention emerged as distinct but related dimensions.
Wayagi et al. (2025)	Kenya; gender-disaggregated analysis of potato productivity and ICT platforms.	Gender gaps and role of information and communication platforms.	Digital-platform use is relevant, but gendered resource constraints remain central to observed outcomes.

What market information women need

Price information is the most visible component of market information, but it is not sufficient on its own. Women also need information on buyer identity, volume requirements, quality grades, payment terms, transport availability and cost, storage options, likely demand, and the timing of market peaks. Information must be specific enough to support a decision. A price quoted without location, grade, unit of measurement, date, and buyer conditions may have little practical value and may even mislead farmers (Magesa et al., 2020). For potato, perishability makes logistical information especially important. A woman may know that a distant market offers a higher price but still sell locally if transport is unavailable, the expected loss during handling is high, or immediate cash is needed. Storage technology can extend the selling window, but requires capital, knowledge, and appropriate facilities (Akello et al., 2022). Post-harvest management and market information should therefore be treated as linked services rather than separate interventions (Balana et al., 2022).

Pathways from information to market participation

The first pathway is improved decision quality. Timely information can help women compare outlets, avoid selling immediately after harvest when supply is high, and plan

production or aggregation around expected demand. It can also reduce search costs by identifying buyers before produce is moved. These benefits are plausible and supported by studies of agricultural market information and digital-platform use, although observed associations are often intertwined with wealth, extension access, and experience (Maina et al., 2023; Magesa et al., 2020). The second pathway is stronger bargaining. Knowledge of prevailing prices and buyer alternatives can narrow information gaps between farmers and traders. However, information improves bargaining only where women have authority to negotiate, control over the crop or income, and a credible alternative buyer. Where social norms assign sales decisions to men or where transport and cash constraints leave only one feasible buyer, price knowledge may increase awareness without changing the transaction (Wamuyu, 2019; Mudege et al., 2015).

The third pathway is coordination. Market information can support collective bulking, shared transport, grading, and contact with larger buyers. Group membership was positively associated with potato commercialization in Kenya, and qualitative work in Malawi shows that collective action can create opportunities for women. Yet groups are not automatically inclusive. Leadership, meeting times, membership rules, benefit distribution, and household approval can determine whether women participate meaningfully (Wakaba et al., 2022; Mudege et al., 2015). The fourth pathway is reduced perceived and actual risk. Reliable buyer, price, quality, storage, and transport information can reduce uncertainty, but it cannot remove production losses, price shocks, delayed payments, or opportunistic trading. Information services are more useful when connected to verified buyer lists, dispute-resolution mechanisms, storage, credit, insurance, or contracting support. Without these complementary services, women with limited assets may rationally choose lower-return but safer local sales.

Gendered barriers to access, interpretation, and action

Device access is often measured as household phone ownership, but this can conceal who controls the device, airtime, password, and timing of use. Shared phones may restrict privacy and reduce the ability to contact buyers. Even when a woman receives a message, literacy, language, numeracy, and familiarity with market units affect interpretation. Digital tools that assume continuous internet access, individual smartphone ownership, and high literacy are therefore likely to exclude part of the intended audience (Coggins et al., 2022; Emeana et al., 2020; Correa and Pavez, 2016). Infrastructure and affordability remain basic constraints. Rural connectivity gaps, unreliable electricity, device costs, and data charges influence regular use and may be more restrictive for women with lower independent income. Broader reviews of digital agriculture show that these problems are not temporary implementation details; they shape who is able to adopt and benefit from digital services (Choruma et al., 2024; Gumbi et al., 2023; Cabrera-Castellanos et al., 2021).

Information also competes with time and mobility constraints. Extension meetings and markets may be scheduled or located in ways that conflict with domestic and care responsibilities. Women may receive production advice but not market information, or attend training without gaining control over sales. Gender-responsive extension requires deliberate targeting, suitable timing and location, attention to household decision-making, and formats that do not depend only on formal literacy (Adebayo and Worth, 2024; Lecoutere et al., 2023; Mudege et al., 2020). Financial inclusion is equally important. Information that reveals a profitable opportunity has limited effect where a

woman cannot finance transport, storage, packaging, or the delay between delivery and payment. In Nigeria and other smallholder settings, gender gaps in access to formal finance can prevent women from converting market knowledge into market action (Adegbite and Machethe, 2020). The practical unit of intervention is therefore not information alone, but information combined with the capabilities and resources needed to use it.

Strengths and limits of different communication channels

Mobile applications and web platforms can provide current, individualized, and interactive information, including buyer matching and digital records. Their advantages are greatest for users with reliable devices, connectivity, literacy, and confidence. Evidence from M-shamba shows that access and actual use should be evaluated separately, because farmers who know about a platform may still not use it for marketing (Maina et al., 2023). Mobile services should therefore be tested for active use, completed transactions, and distribution of benefits, not only registration numbers. SMS and basic-phone services can reach users without smartphones, but text length, literacy, language, and unit conventions limit what can be communicated. Voice messages, interactive voice response, and call centres may improve accessibility, particularly when combined with local-language content and human support. Studies of mobile phone use among smallholders show that farmers often use phones through informal combinations of calls, messaging, peer networks, and extension contacts rather than through a single official application (Krell et al., 2021).

Radio remains useful where digital access is weak and can reach many listeners at low cost. Agricultural radio can disseminate price trends, buyer requirements, and programme information, especially when local languages and call-in formats are used (Mhlaba and Yusuf, 2020; Mtega, 2018). Its weakness is limited personalization and difficulty confirming whether information applies to a particular market, grade, or time. Radio is therefore strongest as part of a blended system that provides follow-up through extension workers, farmer groups, or mobile channels. Video-based and facilitated digital extension can overcome some literacy barriers because demonstrations are visual and can be discussed in groups. Experimental evidence from Ethiopia and Uganda suggests that the way information is targeted and delivered can affect learning, adoption, and women's empowerment (Abate et al., 2023; Lecoutere et al., 2023). However, production advice and market participation are not the same outcome. Market-oriented content should include negotiation, grading, buyer verification, cost calculation, and collective selling, rather than focusing only on agronomy (*Table 3*).

***Table 3**. Market information functions, gendered constraints, and practical design responses.*

Information function	Decision supported	Common constraint for women	Practical response
Prices and units	When, where, and at what price to sell.	Limited phone control; weak numeracy; non-standard bags or measures.	Local-language voice/SMS; state location, date, grade, and unit; support standard measures.
Demand and buyer contacts	Buyer selection, volume planning, and market entry.	Exclusion from trader networks; mobility limits; risk of fraud.	Verified buyer directories; group-based introductions; complaint and dispute channels.
Quality and grades	Sorting, grading, packaging, and price negotiation.	Less access to training and equipment.	Visual demonstrations; women-targeted training; affordable grading and packaging support.

Transport and storage	Whether to sell now, store, aggregate, or use a distant market.	Limited working capital, transport control, and storage access.	Collective storage and transport; transparent cost calculators; links to finance.
Risk and payment terms	Choice of contract, credit sale, insurance, and timing.	Lower asset buffers and bargaining power.	Clear payment conditions; digital records; risk-sharing products; verified contracts.

Intention, participation, and outcomes are different

A major weakness in the literature is the frequent movement between intention, participation, commercialization, productivity, and profitability as though they were interchangeable. Intention is a stated willingness or plan; participation is actual entry into a market; commercialization concerns the share or value of output sold; and profitability depends on revenue and costs. A woman may intend to market potatoes but be prevented by household decisions, transport, cash needs, or low output. Conversely, she may sell produce through a household member without being recognized as the marketing decision-maker. Goshit et al. (2025) identifies information and intention as related but distinct dimensions, reinforcing the need for clear outcome definitions. Future studies should measure the full sequence: exposure to information, individual access and control, comprehension, trust, use in a named decision, completed sales, price net of costs, control over income, and changes in empowerment or welfare. This sequence would make it possible to identify where an intervention fails and whether benefits reach women themselves.

Information is necessary but not sufficient

The central conclusion is that market information is an enabling resource rather than an independent solution. It can reduce search costs and uncertainty, improve comparison among buyers, and support coordinated marketing. Its effect is constrained, however, by the user's authority, assets, skills, and market options. This explains why the same platform can benefit some farmers and exclude others, and why information interventions frequently show uneven uptake (Coggins et al., 2022; Emeana et al., 2020). A useful interpretation is a five-stage pathway: information must be available, accessible to the woman concerned, understandable and trusted, used in a decision, and supported by the capacity to act. Failure at any stage weakens the link with market outcomes. For example, a reliable price message has no effect if the woman does not control the phone; access has little effect if the unit is unclear; understanding has little effect if she cannot finance transport; and a completed sale may not improve empowerment if she does not control the proceeds (*Table 4*).

***Table 4**. Capability pathway from market information to women's market outcomes.*

Availability	Access and control	Understanding and trust	Use and capacity to act	Market and empowerment outcomes
Timely, accurate, specific information exists.	The woman can receive it through a device, group, radio, or extension channel.	She can interpret the price, grade, unit, buyer, and conditions.	She can negotiate, transport, store, aggregate, or finance the sale.	Participation, net returns, bargaining power, and control over income may improve.

Implications for policy and programme design

Information services should use blended channels. A smartphone application alone will not reach all women, while radio alone cannot provide individualized buyer or transaction support. A practical system can combine radio or community

announcements for wide reach, SMS or voice messages for regular updates, farmer groups for interpretation and aggregation, and extension workers or call centres for follow-up. The design should be based on actual phone ownership, literacy, language, and connectivity in the target area rather than assumptions about rural users (Choruma et al., 2024; Daum, 2023). Content quality should receive as much attention as delivery technology. Price messages should identify the market, date, grade, unit, buyer type, and expected transaction conditions. Buyer-matching services should verify identities and provide a method for reporting delayed payment or fraud. Information should be updated frequently enough to remain useful for a perishable crop. Women need the means to act. Programmes should connect market information with savings or credit, collective transport, storage, grading, standard weights, and producer organizations. Financial products should reflect women's lower collateral ownership and may need group guarantees or transaction records rather than conventional land-based collateral (Adegbite and Machethe, 2020). Monitoring should be gender-specific. Providers should report not only the number of registered users but also women's individual access, active use, completed transactions, net prices, control over revenue, and reasons for non-use. Household-level registration can hide whether women receive or control the service. Qualitative feedback is needed to identify norms, safety concerns, and design problems that routine platform data cannot show.

Relevance to Nigerian potato markets

The Nigerian evidence base remains thinner than that of Kenya and parts of East Africa. Mobile-phone initiatives have demonstrated potential to improve women's market access, but infrastructure, affordability, finance, and institutional support remain constraints (Chete and Fasoyiro, 2014). In Plateau State, recent evidence shows that market information is one component of women's perception of participation alongside market form, access, experience, and intention (Goshit et al., 2025). This supports interventions that combine information with physical market access, organization, training, and finance rather than treating information as a stand-alone input. A locally relevant service could publish verified prices for named markets and grades, provide local-language voice updates, connect women's groups with buyers, and coordinate transport and storage. It should be developed with women traders and farmers from the start, tested with basic phones as well as smartphones, and evaluated against actual sales and income control. Such a design would address both information gaps and the practical constraints that determine whether information changes behaviour.

Research priorities

The first priority is stronger outcome measurement. Studies should distinguish exposure, access, use, intention, participation, commercialization, price, net return, and control over income. Sex-disaggregated results should be reported even when the household is the sampling unit. The second priority is causal and longitudinal evidence. Randomized or phased programme evaluations, natural experiments, panel data, and matched comparisons can test whether information changes market behaviour after accounting for wealth, production, extension contact, and distance. Qualitative work should accompany these designs to explain non-use and unintended effects. The third priority is comparative channel evaluation. Mobile applications, SMS, voice, radio, video, extension, and farmer groups should be compared on reach, cost, sustained use,

trust, transaction completion, and distribution of benefits. A channel that reaches many users may still be less effective than a smaller service that provides accurate, actionable, and verified information. The fourth priority is intersectional analysis. Women's experiences differ by age, education, marital status, disability, ethnicity, location, farm scale, and role in the value chain. Research should avoid treating women as a single category and should examine who is excluded from digital and collective-market interventions. The fifth priority is attention to harm and market power. Digital platforms can create new dependencies, expose personal data, enable fraud, or reinforce dominant buyers. Evaluation should include privacy, consent, data ownership, platform governance, payment delays, and the possibility that better information does not translate into a fairer market.

Conclusion

Access to timely and reliable market information can strengthen women's participation in Irish potato marketing by improving buyer search, sales timing, negotiation, storage, transport, and collective action (Maina et al., 2023; Wakaba et al., 2022; Magesa et al., 2020; Mudege et al., 2015). The evidence does not support the claim that information alone automatically raises productivity, income, or empowerment (Wayagi et al., 2025; Goshit et al., 2025; Maina et al., 2023). Benefits depend on women's control of devices and decisions, their ability to understand and trust the information, and their access to output, finance, transport, storage, groups, and responsive institutions (Adebayo and Worth, 2024; Lecoutere et al., 2023; Adegbite and Machethe, 2020; Mudege et al., 2020). The strongest policy approach is therefore a blended and gender-responsive market-support system that combines accurate information with the practical means to act on it (Choruma et al., 2024; Daum, 2023; Gumbi et al., 2023). Future research should measure the full pathway from information exposure to completed transactions, net returns, and women's control over income. This review has several limitations. It is structured but not fully systematic, and no PRISMA flow, protocol registration, or formal risk-of-bias score is reported (Snyder, 2019). The literature directly linking women, market information, and Irish potato marketing is small, so contextual evidence from other smallholder sectors was used cautiously (Goshit et al., 2025; Maina et al., 2023; Mudege et al., 2020). Most direct studies are cross-sectional and concentrated in a limited number of African countries, which restricts causal inference and generalization (Goshit et al., 2025; Maina et al., 2023; Wakaba et al., 2022; Daniel et al., 2018). Publication in English may also exclude relevant local evidence. These limitations mean the review identifies consistent mechanisms and design principles rather than a single quantitative effect size.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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