

ZEVA: A Web-Based Farmer-to-Consumer Marketplace for Direct Fresh Crop Commerce

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Abstract—ZEVA is a web-based agricultural commerce concept designed to shorten the distance between crop producers and end consumers. The public project interface describes the service as a platform for buying fresh crops directly from farmers. This paper develops that concept into a structured digital marketplace architecture in which farmers can present available produce while consumers can discover, evaluate, and request fresh agricultural products through a single online channel.

The central research contribution is a farmer-to-consumer interaction model that treats produce availability, source visibility, freshness information, order intent, and transaction traceability as connected information rather than isolated shopping functions. The paper proposes a modular architecture containing identity and role management, farmer produce publishing, consumer discovery, cart and order processing, availability-aware inventory, transaction records, and an administrative oversight layer. A distinctive feature of the proposed model is the introduction of a freshness-aware commerce perspective: agricultural products are time-sensitive assets, so the marketplace should represent availability and harvest context instead of treating every product as a static catalogue item. The study also defines a measurable evaluation framework covering usability, response time, order accuracy, information completeness, transaction transparency, and farmer-side accessibility. The work is presented as a system design and research framework; implementation-specific technologies and numerical performance claims are not asserted where they cannot be verified from the publicly accessible project interface.

Index Terms—Agricultural e-commerce, farmer-to-consumer, digital agriculture, fresh crop marketplace, farm-to-consumer commerce, supply-chain transparency, web application, food traceability.

INTRODUCTION

Agricultural commerce involves a product that differs fundamentally from many conventional e-commerce categories: its value is affected by harvest time, perishability, local availability, quality, seasonality, and the number of transactions between producer and consumer. A digital marketplace for fresh crops therefore cannot be treated only as an online catalogue. It must represent the relationship between the producer, the produce, the buyer, and the time-sensitive nature of supply.

The public ZEVA website presents itself as “Zeva2 - Buy Fresh Crops Directly from Farmers,” establishing a direct farmer-to-consumer proposition [8]. This positioning is consistent with a wider movement toward digital agricultural markets. India’s e-NAM describes an electronic trading portal intended to connect agricultural markets and improve transparency, access to buyers, price discovery, and online transactions [1], [2]. Research on

direct-market farmers also indicates that online sales can expand market access, while reliable internet access and digital skills remain important adoption constraints [3].

ZEVA can be studied as a complementary, consumer-facing digital marketplace model: instead of beginning with a physical market transaction and digitising only the trading record, the platform can begin with the farmer's available crop and expose that supply to consumers through a web interface. The resulting research problem is not simply how to sell crops online, but how to design a digital interaction that preserves source visibility, freshness context, availability, and transaction clarity.

The main contributions of this paper are:

- An original conceptual architecture for direct fresh-crop commerce centred on farmer-to-consumer interaction.
- A freshness-aware product representation in which availability and harvest context are treated as first-class marketplace information.
- A role-separated workflow covering farmer publishing, consumer discovery, ordering, fulfillment, and administrative oversight.
- A traceability-oriented transaction model that preserves the relationship between a listed crop, its producer, its availability state, and the resulting order.

BACKGROUND AND RELATED WORK

Digital Agricultural Marketplaces

Digital agricultural marketplaces are not new, but their goals and operating models vary. Government-backed e-NAM is designed as a pan-India electronic trading portal connecting existing agricultural markets, with objectives including improved market access, reduced information asymmetry, transparent price discovery, and online payment [1], [2]. Analytical work on e-NAM also discusses the potential of digital trade to transform agricultural commerce in India [5]. A farmer-to-consumer marketplace such as ZEVA addresses a different interaction layer: the consumer discovers produce as an online retail item while the producer becomes the visible source of that item.

Recent research on direct-market farmers shows that online selling may improve market access, but adoption is influenced by internet reliability, financial resources, training, and farm characteristics [3].

Research on Indian digital marketplaces similarly identifies perceived usefulness, ease of use, trust, and platform reputation as relevant factors in farmers' willingness to use digital marketplaces [4]. These findings motivate a design that minimizes unnecessary complexity on the farmer side while presenting sufficient information to consumers.

The research gap addressed in this paper is narrower than the broad problem of agricultural digitisation. The gap is the design of a fresh-crop marketplace in which product availability, source identity, freshness context, and order state are modeled together. Existing digital market systems demonstrate the value of market integration and

transparency, while direct-to-consumer studies emphasise online access and adoption. ZEVA provides a project-level setting for combining these ideas into a consumer-oriented workflow.

Table 1 Comparison of Marketplace Approaches

Approach	Primary user	Market interaction	Freshness context	Traceability focus
Traditional retail chain	Consumer + retailer	Multi-stage	Often implicit	Low at consumer interface
Mandi / e-market model	Farmer + trader	Market / auction	Commodity / lot based	Transaction oriented
Generic e-commerce	Consumer + seller	Catalogue / order	Usually static	Seller / order oriented
Proposed ZEVA model	Farmer + consumer	Direct digital order	Availability + harvest context	Crop, farmer, order

Table 1 highlights the intended distinction of the proposed model. The comparison is conceptual rather than a claim that every implementation of the listed approaches has identical functionality. The design objective is to make agricultural origin and the time-sensitive nature of fresh produce visible within the same transaction workflow.

Adoption, Trust, and Market Structure

Studies of digital agricultural marketplaces keep returning to one theme: technology availability is rarely the bottleneck. Research on Indian farmers' use of digital marketplaces associates adoption with perceived usefulness, ease of use, and trust in the platform [4]. Work on eNAM adoption in Tamil Nadu and on farmers' participation in electronic marketing reaches a related conclusion, namely that awareness, training, and access to supporting infrastructure shape whether a platform is used at all [12], [13]. Evidence on small-farmer market access in South India likewise points to the importance of the surrounding institutional and infrastructural environment, not only the software [14].

Market structure also matters. Analyses of electronic agricultural markets under concentrated buyer power show that a digital channel does not by itself remove the influence of intermediaries [15], and a study of Bengaluru's agri-food supply chains examines how middlemen operate and adapt in a data-rich environment [6]. For a consumer-facing platform like ZEVA, this suggests treating disintermediation as a hypothesis to test, not an assumed benefit. Broader reviews of e-commerce in Indian agricultural marketing describe both opportunities for income and access and persistent challenges for farmers [7], [17]. Earlier work on e-commerce and nutritious food access frames the same channel from the consumer's side [16].

Consumer Perceptions and Traceability

On the demand side, research on fresh-food consumers and smallholder e-marketplaces examines the perceptions and attitudes that influence willingness to buy fresh

produce online [9]. Because consumers cannot touch or smell the product, the information shown on screen has to carry more of the decision. This is the motivation for the freshness-aware listing model in Section V-C. Reviews of food traceability point out that farmer participation depends on a supporting ecosystem of incentives, tools, and trust [18], so any traceability feature has to be affordable in effort for the person entering the data. Work on digital technologies in local agri-food systems argues for interoperability at the farmgate level [11], which supports keeping ZEVA's data model open to future integrations. Evidence from sub-Saharan smallholder contexts shows that e-commerce effects on farming practice depend heavily on local conditions [19], so results from one region should not be transferred to another without testing.

PROBLEM STATEMENT AND OBJECTIVES

The core problem is the absence of a simple digital interaction path between a farmer who has fresh produce available and a consumer seeking that produce. Physical distance, fragmented information, limited visibility into availability, and multiple transaction stages can make it difficult for a consumer to identify the source of produce and for a farmer to reach end buyers directly. Digital marketplaces can reduce information friction, but only when their interfaces are understandable and their data models reflect the characteristics of agricultural products.

The project is therefore framed around the following objectives:

- Provide a web-based discovery channel for fresh crops offered directly by farmers.
- Represent farmer identity or source information alongside the crop listing where appropriate.
- Allow consumers to discover produce and express purchase intent through a structured ordering workflow.
- Maintain an explicit availability state so that stale or unavailable listings can be distinguished from active supply.
- Preserve a digital relationship between product, producer, order, and transaction status.
- Design the platform so that additional logistics, payment, quality, and traceability services can be integrated later.
- Create an evaluation framework that can quantify technical performance and user experience without assuming unverified results.

STAKEHOLDER AND REQUIREMENTS ANALYSIS

A marketplace has at least three kinds of participants whose goals only partly overlap. Making these goals explicit early keeps later design decisions traceable.

Farmers want to reach buyers with little effort, set their own prices, and avoid commitments they cannot keep. Their typical constraints are limited time during harvest, uneven connectivity, and varied comfort with text-heavy interfaces. The main functional

requirements are quick listing creation, easy quantity updates, a clear view of incoming orders, and the ability to mark produce unavailable immediately.

Consumers want to find fresh produce, understand where it comes from, and trust that what they see is still available. Their requirements include search and filtering, clear price-per-unit display, visible availability state, a simple order flow, and an order history they can revisit.

Administrators need to keep the platform orderly. Their requirements include moderating listings and accounts, resolving disputes, monitoring unusual activity, and reviewing aggregate platform activity without needing access to unnecessary personal data.

Requirements can be grouped into functional and non-functional categories. Functional requirements cover registration, role assignment, listing management, discovery, ordering, status tracking, and administration. Non-functional requirements cover responsiveness on low-bandwidth connections, readability on small screens, data integrity of order records, confidentiality of account information, and availability during peak ordering periods. Table 2 maps these groups to the architectural layers.

Table 2 Requirement Groups and Architectural Mapping

Requirement group	Primary stakeholder	Architectural layer
Fast listing and stock update	Farmer	Farmer layer, produce catalogue
Clear discovery and filtering	Consumer	Consumer layer, discovery engine
Stable order records	Consumer, farmer	Transaction layer
Moderation and dispute handling	Administrator	Governance layer
Low-bandwidth usability	All	Presentation layer

PROPOSED ZEVA ARCHITECTURE

The proposed architecture is organized into five logical layers: presentation, marketplace services, agricultural product data, transaction and order management, and administrative oversight. The layers can be implemented using different technologies; this paper deliberately keeps the architecture technology-neutral because the public project page does not expose a complete implementation stack.

The conceptual flow is: Farmer → Produce Listing → Marketplace Catalogue → Consumer Discovery → Order Request → Order State → Farmer/Consumer Confirmation.

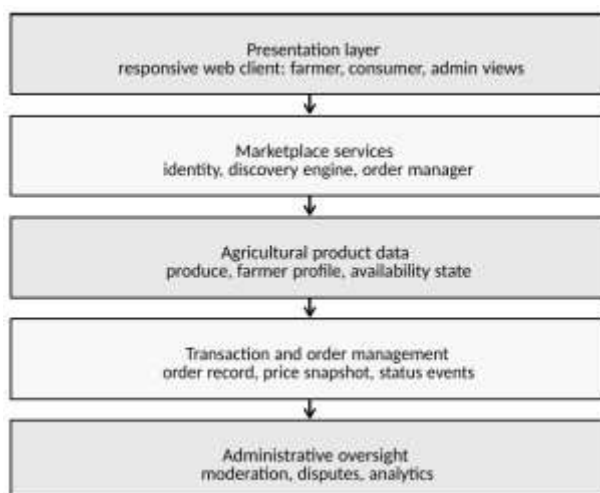


Figure 1 Layered View of the Proposed ZEVA Architecture

Farmer Layer

The farmer layer is the supply-side entry point. A farmer should be able to create or manage a produce listing containing fields such as crop name, category, quantity, unit, price, availability, source information, and optional harvest or freshness context. The interface should prioritize low cognitive load because digital adoption research identifies ease of use and trust as relevant factors in marketplace participation [4].

Consumer Layer

The consumer layer converts agricultural supply into an understandable shopping experience. Product cards should expose the information necessary for an informed decision without forcing users through agricultural terminology. Search, category filtering, availability filtering, product details, cart or order intent, and order-history views form the core interaction sequence.

Freshness-Aware Product Model

A unique design element proposed for ZEVA is a freshness-aware product model. Instead of representing a crop only as a name and price, a listing can carry an availability window, harvest date or harvest context when provided, quantity remaining, and an availability state. This model recognizes that fresh produce is time-sensitive. The field should be optional where the farmer cannot reliably provide it, avoiding false precision.

Transaction Layer

The transaction layer connects a product listing to an order without losing the identity of the originating listing. A conceptual order record contains order identifier, consumer identifier, farmer identifier, product identifier, quantity, price snapshot, order time, fulfillment state, and cancellation or completion state. Keeping a price snapshot at order time is important because marketplace prices can change after an order is created.

Administration and Governance Layer

Administrative functions can include account moderation, listing review, category management, dispute handling, transaction monitoring, and platform analytics. These functions are proposed governance capabilities rather than claims about features currently visible on the public website.

FUNCTIONAL DESIGN AND WORKFLOW

The proposed workflow is designed to reduce the number of information transformations between production and consumption. A farmer publishes available produce; the marketplace validates required listing fields; the product becomes discoverable; a consumer inspects the listing and places an order request; the platform records the order state; and both sides receive a consistent representation of the transaction.

The system can be represented through six functional modules:

- **Identity and access:** separates farmer, consumer, and administrator responsibilities.
- **Produce catalogue:** stores crop descriptions, pricing, quantity, category, availability, and source information.
- **Discovery engine:** supports search, filtering, sorting, and product-detail navigation.
- **Order manager:** creates orders, captures quantity and price state, and tracks fulfilment.
- **Traceability record:** preserves links among farmer, listing, order, and status changes.
- **Administration and analytics:** monitors listings, orders, platform activity, and operational exceptions.

Table 3 Core Entities of the Logical Model

Entity	Representative fields	Purpose
Farmer	farmer ID, profile, contact, verification state	Identifies the supply-side actor
Produce	crop ID, name, category, quantity, unit, price, availability	Represents an available agricultural item
Order	order ID, buyer ID, farmer ID, item ID, quantity, price snapshot, status	Records purchase intent and fulfilment
Event / Status	timestamp, actor, previous state, new state	Supports operational traceability

Listing and Order Lifecycles

Two lifecycles run side by side in the marketplace. The listing lifecycle begins when a farmer creates a draft. Once required fields are complete, the farmer activates it and it becomes visible. As quantity falls below a farmer-defined threshold, the listing enters a low-stock state, and it becomes unavailable when stock reaches zero or when the farmer withdraws it. A listing can be reactivated when new produce is harvested.

The order lifecycle begins when a consumer places an order request. The farmer then confirms or declines it. A confirmed order moves to fulfilment, and finally to completion once the consumer receives the produce. Cancellation is permitted at defined

points, and the rules for each point should be stated plainly to both parties before an order is placed. Each transition records the acting user, the time, and the previous and new states, which gives the event trail described in Section VII.

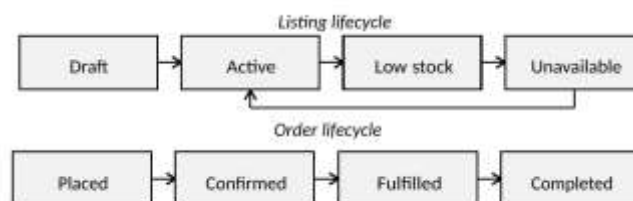


Figure 2 Listing and Order Lifecycles Recorded as Timestamped State Events

Handling Concurrency and Stock Conflicts

Fresh produce is often sold in small quantities, so two consumers may try to order the last units at nearly the same moment. The server should treat quantity as authoritative and check remaining stock at the moment an order is committed, not only when the page was rendered. If the stock is no longer sufficient, the order should be rejected with a clear message that offers the remaining quantity. This avoids silently overselling and keeps the order record consistent with the listing. The same principle applies to price changes: the price snapshot is taken at commit time, not at page-load time.

DATA MODEL AND INFORMATION TRACEABILITY

A marketplace for fresh crops requires a data model that is simple enough for everyday use but expressive enough to preserve agricultural context. A normalized logical model can separate users, produce, listings, orders, order items, and status events. A single user record can be associated with a role, while a farmer-specific profile stores supply-side information. A produce listing then references its farmer and represents a specific available offer.

Traceability in this context does not require blockchain. A conventional auditable transaction model can provide useful traceability when each important state transition is timestamped and associated with an actor. For example, a listing can move from Draft to Active, then to Low Stock or Unavailable; an order can move from Placed to Confirmed, Fulfilled, Cancelled, or Completed. This event-oriented representation makes the platform easier to debug and provides a foundation for future analytics.

A particularly important data-integrity rule is that an order should retain the commercial information that existed when the order was placed. If a farmer later changes the displayed price or availability, historical orders should not silently change. This principle improves consistency between the marketplace interface and transaction records.

USER EXPERIENCE AND ACCESSIBILITY

Agricultural digital platforms must serve users with different levels of digital literacy. The proposed interface therefore follows a progressive-disclosure approach: the first screen

exposes only the most useful information, while detailed crop and source information is available when the user opens an item. Clear language, readable product cards, large touch targets, and visible status indicators can reduce interaction effort.

The farmer interface should prioritize task completion over catalogue sophistication. A listing form can be divided into essential fields and optional fields, with sensible defaults and validation messages. On the consumer side, filters should be understandable in everyday terms such as category, availability, price range, and source. This design direction is supported by research showing that ease of use and perceived usefulness are associated with trust and intention to use digital agricultural marketplaces [4].

The interface should also avoid making unsupported claims about quality, organic certification, pesticide use, or freshness. Such attributes should be displayed only when supplied through an appropriate verification process. This distinction is important because a digital interface can unintentionally turn an unverified seller statement into an apparent platform guarantee.

PRICING, LOGISTICS, AND FULFILMENT CONSIDERATIONS

Direct selling shifts several tasks from intermediaries to the farmer or the platform, and the design should be honest about this.

Pricing. Farmers need to set prices with limited visibility into what comparable sellers charge. The platform may show an optional reference range based on recent listings of the same crop, clearly labelled as informational. It should not force price conformity, since quality and local conditions vary.

Delivery. Fresh crops are perishable and delivery cost can be large relative to basket value. Possible models include farmer-arranged local delivery, scheduled pickup points, and partnered logistics. Each model has trade-offs in cost, reliability, and farmer workload. The platform should store delivery preference and fulfilment method as order attributes so that these models can be compared empirically later.

Payment. Options include payment on delivery and online payment through an external provider. Online payment reduces cash handling and non-payment risk but introduces integration and compliance obligations. The order record should store only the payment status and a provider reference, never card details.

Wastage and returns. Because produce spoils, return policies are difficult. A reasonable approach is a short complaint window with photographic evidence, handled through the administrative dispute process.

The policy should be visible before purchase.

SECURITY, PRIVACY, AND TRUST

A farmer-to-consumer marketplace handles account information and potentially sensitive transaction data. Authentication should therefore be separated from product visibility, and authorization rules should prevent one farmer from editing another farmer's

listings. Passwords must never be stored in plain text, and sensitive data should be transmitted over encrypted connections.

Trust should be designed as a system property rather than a visual slogan. Useful mechanisms include verified account states where verification exists, transparent order statuses, timestamped changes, clear cancellation rules, and a visible distinction between seller-provided information and platform-verified information. India's e-NAM 2.0 privacy policy illustrates the importance of explicit data categories, access controls, auditability, and protection of personal and transactional information in agricultural digital platforms [10].

Future versions of ZEVA may incorporate payment providers, logistics partners, or location services. Each integration should follow least-privilege access and should collect only the information required for the service. Privacy settings should also be designed around user consent and purpose limitation.

Threat Model

Realistic threats to a small marketplace include credential theft through weak passwords, unauthorized access to another seller's listings, tampering with prices or quantities in requests, fake listings intended to collect payments, and abuse of review or messaging features. Corresponding controls include salted password hashing, role-based authorization checked on the server for every state-changing request, server-side recomputation of totals, account verification for sellers where feasible, and rate limiting on sensitive endpoints. Logs should record security-relevant events while avoiding unnecessary personal data. A short periodic review of these controls is more valuable than a one-time checklist.

IMPLEMENTATION CONSIDERATIONS

The public ZEVA landing page is JavaScript-driven and therefore does not expose the complete implementation stack through the static page retrieved for this study [8]. Accordingly, this paper does not assign an unverified programming language, framework, database, payment gateway, or deployment provider to the project. The architecture is intentionally technology-neutral so that it can map onto the project's actual implementation.

For implementation, the system can be decomposed into a responsive web client, application/API layer, persistent data store, authentication component, and optional payment and notification services. REST-style endpoints or an equivalent service interface can separate presentation logic from marketplace rules. Validation should occur at both client and server layers, while server-side rules remain authoritative for prices, quantities, roles, and order state.

The deployment environment should support HTTPS, environment-based configuration, database backups, structured logging, error monitoring, and controlled

release management. These are implementation recommendations rather than reported properties of the current public website.

EVALUATION METHODOLOGY

Because the publicly accessible project page does not provide experimental logs or benchmark measurements, this study does not fabricate accuracy, response-time, conversion, or user-satisfaction values. Instead, the following methodology can be applied to the implemented system.

Functional Evaluation

Test cases should verify farmer registration, listing creation, listing update, availability changes, consumer discovery, order creation, order-state transitions, cancellation, and administrative controls. Each test should record expected and observed behaviour.

Performance Evaluation

Measure page-load time, API response time, database query latency, concurrent-user behaviour, and order-processing latency. Report measurements under defined network and hardware conditions so that results are reproducible.

Usability Evaluation

A small controlled user study can evaluate task completion time, task success rate, error frequency, perceived ease of use, and satisfaction for both farmer and consumer workflows. Farmer participants should be evaluated separately because their interaction goals differ from consumer shopping tasks.

Information-Quality Evaluation

Evaluate whether required product information is complete, understandable, current, and consistent across listing, product-detail, cart, and order views. This is especially important for quantity, price, availability, and source information.

Transaction-Integrity Evaluation

Test whether price and quantity snapshots remain stable after an order is created, whether unauthorized users can alter records, and whether every state transition is auditable. These tests directly assess the reliability of the proposed traceability model.

Table 4 Evaluation Metrics and Evidence

Metric	Measurement	Interpretation	Evidence
Task success rate	Completed tasks / assigned tasks	Higher: fewer workflow failures	Test log
Median response time	Median API / page response	Lower: better responsiveness	Performance log

Metric	Measurement	Interpretation	Evidence
Listing completeness	Required fields correctly populated	Higher: better information quality	Data audit
Order integrity	Orders with correct price, quantity, state	Higher: stronger transaction reliability	Database / test audit
Usability score	Standardized questionnaire or SUS	Higher: better perceived usability	User study

Proposed User Study Protocol

A small mixed study can be run once a working build exists. Recruit two groups, farmers or farm-household members and ordinary consumers, with a few participants each, and record their age range, device, and prior experience with online ordering. Give each group scripted tasks. Farmers create a listing, update its quantity, and mark it unavailable. Consumers find a named crop, filter by availability, place an order, and locate it in their history. Record completion time, errors, and whether help was needed. After the tasks, administer a standard questionnaire such as the System Usability Scale and add two or three open questions about trust and clarity. Report results per group, state the sample size, and avoid generalizing beyond it.

Threats to Validity

A convenience sample may not represent rural users. Participants may behave differently under observation. Test devices and network conditions may differ from real use. Reporting these conditions alongside the results lets readers judge how far the findings transfer.

DISCUSSION AND DISTINCTIVE CONTRIBUTION

The distinctive contribution of ZEVA is best understood as an interaction model rather than as the invention of a new e-commerce primitive. Digital agricultural marketplaces already demonstrate that technology can connect producers with broader markets. e-NAM, for example, explicitly targets market integration, transparency, price discovery, and online transactions [1]. The proposed ZEVA model moves the focus to the final farmer-to-consumer relationship and treats fresh produce as a time-sensitive marketplace object.

Three design ideas distinguish the proposed research framework. First, the freshness-aware listing model makes availability and harvest context visible rather than hiding them behind a generic product abstraction. Second, the traceability chain links farmer, listing, order, and state changes without requiring a specialized distributed ledger. Third, the platform is designed around two asymmetric users: farmers need a low-friction publishing workflow, while consumers need a high-clarity discovery and decision workflow.

These ideas also expose important trade-offs. More product information can improve transparency but increase the farmer's data-entry burden. Strong verification can

improve trust but may increase onboarding friction. Rich logistics integration can improve convenience but may introduce additional operational dependencies. The appropriate design should therefore be evaluated empirically rather than assuming that more functionality always produces a better marketplace.

ETHICAL AND SOCIAL CONSIDERATIONS

A platform that displays farmer identity should let farmers decide how much contact and location information is public, since exposing a precise farm location can create safety and privacy risks. Verification processes should be proportionate, so that they do not exclude farmers with limited documentation. Consumers should be told clearly which statements are seller-provided and which are platform-verified. Finally, the platform should avoid design patterns that pressure farmers into over-committing stock, since a missed delivery harms both parties and damages trust.

LIMITATIONS

The principal limitation of this paper is the absence of a verified technical implementation description and experimental dataset in the publicly accessible project interface. Consequently, the manuscript distinguishes the project proposition from the proposed architecture and does not report fabricated performance numbers. A second limitation is that direct farmer-to-consumer commerce depends on logistics, payment, digital literacy, local demand, and internet availability; a web application alone cannot remove these constraints.

Freshness information also presents a measurement challenge. Harvest date is not equivalent to perceived freshness, and platform-provided freshness indicators should not be interpreted as food-safety certification. Similarly, direct selling can reduce certain transaction layers but does not automatically guarantee higher farmer income; outcomes depend on pricing, delivery costs, demand, wastage, and adoption.

FUTURE WORK

Future work should begin with a code-level audit of the ZEVA implementation to map the proposed model to the actual frontend, backend, database, authentication, and deployment components. This should be followed by controlled usability testing with farmers and consumers. A real product dataset can then be used to study availability decay, order cancellation, demand patterns, and seasonal behaviour.

A second research direction is freshness-aware decision support. The platform could estimate remaining availability windows from farmer-entered harvest context and order velocity, while clearly separating model estimates from verified facts. A third direction is logistics-aware matching, where delivery distance, quantity, and time constraints are jointly considered before an order is confirmed. A fourth direction is interoperability with broader

agricultural digital infrastructure, including market information and logistics services, while preserving farmer control over their data.

CONCLUSION

This paper presented ZEVA as a web-based farmer-to-consumer marketplace concept for direct fresh-crop commerce. The public project identity explicitly emphasizes buying fresh crops directly from farmers [8]. Building on that proposition, the paper developed a technology-neutral architecture covering farmer listing, consumer discovery, freshness-aware product information, ordering, transaction traceability, administration, security, and evaluation.

The research contribution is not a claim that ZEVA replaces established agricultural markets. Instead, it proposes a focused digital interaction model for connecting producers and consumers while preserving the information that matters for fresh agricultural products. The next stage is empirical validation using the actual implementation, real product data, and representative users. Such validation will allow the project to move from a promising digital marketplace concept to a measurable research contribution.

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