

Market orientation and perceived risk among smallholder farmers in Kamrup district of Assam in North Eastern India

Krishnakhi Choudhury

reachkrishnakshi@gmail.com

Assam Down Town University

Research Article

Keywords: market orientation, perceived risk, smallholder farmers, agricultural marketing, Assam, North-Eastern India, agripreneurship, agricultural commercialization, India

Posted Date: September 18th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10676301/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

This study examines how smallholder farmers in Kamrup district, Assam (North-Eastern India), orient themselves toward markets and what risks they associate with doing so. Primary survey data were collected from 300 farming households across eight villages in the Hajo and Sualkuchi development blocks. Market orientation was assessed across four dimensions, namely responsiveness to customer needs, quality product orientation, demand-driven cropping, and advance supply arrangements, alongside six perceived risk categories: production, personal, financial and credit, technology, institutional, and price risk. Data were analysed using descriptive statistics, independent samples t-tests, one-way ANOVA, and Pearson's correlation. Quality orientation ($t = -3.98$, $p < 0.001$) and the composite market orientation score ($t = -2.91$, $p = 0.004$) differed significantly between blocks. Marketing behaviour also diverged, as 42.0% of Sualkuchi farmers sold immediately after harvest versus 23.3% in Hajo ($p < 0.001$). Production risk was cited most frequently (43.0%), followed by personal risk (36.7%) and financial risk (34.7%). Market orientation differed across farmer categories ($F = 3.57$, $p = 0.030$) but showed no correlation with household income ($r = -0.017$, $p = 0.768$), suggesting that structural barriers such as inadequate storage, intermediary dependence, and very small holdings block the orientation-to-income pathway. Findings inform block-level marketing policy, post-harvest infrastructure planning, and risk management. The results also extend the agripreneurship literature by showing that, under weak market institutions, smallholder portfolio entrepreneurship is necessity-driven and decoupled from market orientation.

1. Introduction

Smallholder agriculture remains the backbone of rural life across much of the developing world, from Sub-Saharan Africa to South-East Asia to the Indian subcontinent. Take it away, and village economies fall apart. For all that, the system is deeply fragile. Plots keep shrinking as families divide land among heirs. Soils are tired in places that have been farmed hard for decades. Rainfall has grown unpredictable, and climate variability makes cropping calendars unreliable. All of that is serious, but none of it is the deepest problem. The toughest challenge, and it has been this way for a long time, is turning a harvest into steady cash [1, 2]. Market access is where things break down. Twenty years of research from different parts of the world keeps circling back to the same point: how much a family produces in the field is only part of the picture. Whether that family can actually sell at a decent price, whether they know what buyers are looking for, whether they can keep quality consistent and handle the risks of commercial agriculture, that is what separates households that get ahead from those that stay stuck [3, 4, 5].

Market orientation as a concept came out of business management research before agricultural scholars started using it. Kohli and Jaworski [9] and Narver and Slater [10] were the ones who shaped the original idea. Their work focused on how companies collect customer information, pass it around internally, and then do something with it. Since then, people studying agriculture have borrowed this framework and applied it to farming households. The questions they ask are practical ones: do farmers choose crops based on what buyers want? Do they pay attention to price signals? Do they try to meet

quality benchmarks? These are far from theoretical concerns. Rural markets have become considerably more complicated. The supply chain restructuring of recent decades, combined with evolving consumer preferences, has put farming households under pressure to operate in ways their parents never had to [6, 7, 8]. What does a market-oriented farmer actually look like? Someone who picks crops based on what people want to buy, who takes care with grading and packaging after harvest, who sells through more than one outlet, and who might line up buyers before the season even starts. A farmer who is not market-oriented does none of this. That person grows whatever has always been grown or whatever the family needs to eat, and sells the leftover at the nearest weekly market for whatever the going rate happens to be.

India is a good place to study these dynamics because agriculture is still a massive part of the economy. More than 40 per cent of the workforce farms, and the sector contributes around 17 per cent of national GDP. Recent years have brought big policy shifts [11]. e-NAM, the electronic agricultural trading platform, was rolled out. Farmer Producer Organisations got a push. Contract farming was promoted. The stated goal behind all of it was straightforward enough: make prices visible, reduce the cut taken by middlemen, and bring small producers into formal supply chains [12, 13]. But whether any of this actually reached the farmers who need it most is another matter entirely. In the North-East, honestly, the picture is not encouraging. Research from the region is limited, and what exists paints a fairly bleak picture [14, 15]. Wealthier, better-networked families grabbed the benefits. The rest went on selling through middlemen at spot prices, doing exactly what they had done before the reforms.

Assam stands out among North-Eastern states. It has the most agricultural land and the largest rural population in the region. Strangely, though, very few researchers have looked at market orientation here. The Brahmaputra valley has some of the best alluvial soils anywhere in India. The humid subtropical climate allows for considerable crop variety. Guwahati, the commercial centre of the entire region, lies within reasonable distance. On paper, the conditions for commercially oriented farming are present. In practice, however, that promise has gone largely unfulfilled. Rice paddy dominates roughly 60% of the cultivated area, although vegetable and horticultural production have been expanding in the areas surrounding Guwahati [16]. Clearly, market opportunities exist and are growing. Despite this, the majority of smallholder farmers continue to sell through local middlemen at whatever prices prevail right after harvest. Very few participate in marketing channels that reward quality or respond to specific demand patterns. The underlying causes are well documented at this point. Farm plots are tiny and keep getting divided further. Rural road networks remain poor. Cold storage facilities are practically absent. Farmers struggle to access formal credit. Extension services, rather than expanding, have thinned over time.

Risk perception runs alongside market orientation and cannot be separated from it. When a farmer invests in a commercial crop, or locks into a supply arrangement, or decides to hold produce and wait for better prices, uncertainty is part of the decision. Will it rain at the right time? Will pests be manageable? Those are production questions. On the financial side: can credit be obtained, and at what rate? Will input costs eat into whatever the output fetches? There is also institutional uncertainty. Government support programmes may continue or they may not. Rules change. And then the market itself: will the

price at harvest actually cover what was spent? Hardaker et al. [17] use the term perceived risk to distinguish what farmers feel and believe about these uncertainties from objective risk that could, at least in theory, be calculated from data. What farmers believe about risk ends up mattering as much as the risk itself. A household that sees commercial farming as dangerously uncertain will pull back into subsistence strategies. Those strategies limit losses, sure, but they also put a ceiling on what the family can earn.

How market orientation and perceived risk relate to each other is complicated, and not in an obvious way. When institutional safety nets are weak or absent, a strange thing can happen. Commercial farming exposes households to price crashes, failed technologies, and debts that a subsistence farmer simply never encounters. A family barely getting by faces a particular kind of trap: one bad season, one price collapse, and they go from managing to going hungry. So it is entirely plausible that the farmers who engage most actively with markets are also the ones who feel the most exposed. They have more riding on market outcomes than someone who never ventured beyond subsistence. Whether this paradox actually shows up among farming households in Hajo and Sualkuchi blocks of Kamrup district is one of the questions this study was designed to answer.

The study also engages with writing on agripreneurship, which looks at farming through an entrepreneurial lens. Respondents were grouped into three categories: Agricultural Entrepreneurs, Farmers, and Progressive Farmers. Each group occupies its own position between pure subsistence and full commercial farming. They are expected to differ in market orientation, naturally, but the differences run deeper than that. Risk tolerance, resource access, institutional support: all of these vary across the three groups [18, 19]. Much of the existing agripreneurship literature stays at the conceptual level. By documenting how these farmer types actually behave in specific villages of Kamrup district, this study brings some empirical grounding to that largely theoretical body of work.

Data collection relied on a cross-sectional household survey. Three hundred farming families were interviewed across eight villages, four each in the Hajo and Sualkuchi blocks of Kamrup district, Assam. All fieldwork was completed between June and September 2025. The analysis pursued two objectives. First, it looked at how the four dimensions of market orientation played out across development blocks, farmer categories, and socio-economic groupings. The second was to identify which perceived risk types are most prominent among these farming households and how they are distributed across the two blocks and across farmer types. Two hypotheses were tested. H1 predicted that socio-economic conditions would be better among farmers with higher market orientation. H2 predicted a positive relationship between market orientation and standard of living. North-Eastern India has been persistently underrepresented in agricultural marketing research at the international level. This study contributes field-level evidence from the region, with findings that bear on agricultural marketing and rural development policy in Assam.

2. Literature Review

2.1 The Market Orientation Construct and Its Application to Agriculture

The study of market orientation began with two papers in 1990 that took quite different approaches. Kohli and Jaworski [9] were interested in behaviour: what do organisations actually do with information about their customers? They broke it into three parts, gathering market intelligence, circulating it internally, and then responding to it. Attitudes and mission statements did not concern them; actions did. Narver and Slater [10] came at it from the culture side, asking what kind of organisational ethos produces sustained buyer value. Despite the different starting points, both teams found the same thing: firms that scored higher on market orientation were more profitable. Thirty years on, a large body of follow-up research has corroborated those original results. Neither framework has been superseded.

Slater and Narver [20] pushed the argument further. They tested whether the market orientation advantage only held in fiercely competitive industries and found it did not; the benefit showed up even in calmer competitive settings. They also wove in organisational learning, arguing that market-oriented firms cannot rely on stale knowledge but must keep updating what they know about customers and rivals. Day [21] offered yet another take. He recast market orientation not as an attitude or a culture but as a bundle of capabilities: sensing what is happening in the market, linking up with customers, and managing channel relationships. For anyone studying agriculture, Day's version is arguably the most useful because it asks a very practical question. Never mind whether a farmer thinks in market-oriented terms; does that farmer actually have the skills and conditions needed to act on market knowledge?

From about 2000 onwards, agricultural researchers started borrowing market orientation concepts more actively. Verhofstadt and Maertens [8] studied Rwandan smallholders participating in high-value export value chains and reported clearly higher scores on several market orientation measures compared to non-participating farmers. These farmers paid closer attention to what buyers wanted in terms of quality, handled their produce more carefully after harvest, and maintained tighter relationships with traders. In an influential review of smallholder market integration across Sub-Saharan Africa, Ton et al. [7] stressed that getting farmers to change their behaviour is not enough on its own. Unless the right market institutions and physical infrastructure are also present, resource-poor households simply cannot sustain market-responsive production. From the North American side, Mirzaei et al. [6] reported that farms located closer to large consumer populations performed better, and that farms combining both market orientation and entrepreneurial orientation outperformed those exhibiting only one of these traits. This last finding is directly relevant to the farmer typology adopted in the present study.

Within South Asia, research on market orientation among smallholders remains relatively thin, though it has been picking up. Singh [22] documented how farming households around India's cities were splitting apart along lines of their ability to access modern retail channels. Education proved important, and so did whether a household could arrange transport. Social ties to market actors turned out to be another strong differentiator between households that engaged commercially and those that did not. Birthal et al. [14], looking at crop diversification patterns across Indian states, found that closeness to urban

centres, availability of irrigation, and membership in farmer collectives all raised the chances of a household choosing market-oriented crops. Their observation about farmer collectives resonates with what the present study found regarding farmer clubs serving as hubs for sharing market information. Narayanan [13] surveyed the constraints holding back smallholder market participation in India and described the yawning gap between what small farms could produce and what they actually manage to sell through organised channels as perhaps the defining challenge of Indian agriculture. Bridging that gap, in his assessment, calls for working simultaneously on infrastructure, information access, and institutional reform.

Baker and Sinkula [23] studied small and medium-sized businesses and found that market orientation and entrepreneurial orientation are complementary. Firms possessing both outperformed those with only one. Alsughayir [24] and Nur and Salim [25] replicated this result in different cultural and economic contexts. The complementarity appears to be robust. Applied to this study, the implication is that Agricultural Entrepreneurs, who combine farming with other business activities, should score higher on market orientation than conventional farmers. The data, as will be shown, tell a different and more complicated story.

2.2 Perceived Risk and Its Determinants in Smallholder Farming

Agricultural risk has been a subject of study for much longer than market orientation. Farm management economists recognised early that agriculture is unlike most other economic activities in its risk profile. Production depends on weather. Outputs perish. Commodity prices are volatile. Farmers' decision-making is shaped by these conditions in ways that differ fundamentally from what is observed in most other sectors [26, 27]. The concept of perceived risk, as distinguished from objective risk, entered the literature later. Agricultural economists began incorporating insights from behavioural economics and decision psychology into their models of how farm households behave.

The most comprehensive framework for agricultural risk management remains that of Hardaker, Lien, Anderson, and Huirne [17]. They distinguish five major risk categories: production risk (weather variability, pest pressure, soil degradation); price or market risk (input and output price volatility); financial and credit risk (the cost and availability of borrowed capital); institutional risk (changes in government policy, regulations, and support programmes); and personal risk (health problems, disability, or death of the principal farmer). A sixth category, technology risk, is added in this study following Ayinde [28]. It refers to farmer uncertainty about whether new technologies such as hybrid seeds, chemical inputs, or mechanised equipment will perform as expected under local soil and weather conditions. This dimension has become more important as extension systems introduce new technologies into farming communities that lack the capacity to independently evaluate performance before committing to adoption.

In theory, objective risk can be calculated from historical records. Perceived risk is a different animal altogether. It is shaped by what a farmer has personally experienced, by conversations with neighbours,

by cognitive tendencies that psychologists have documented, and by the accumulated knowledge a community builds up over generations. Patrick and Musser [29] drew attention to this gap between objective and perceived risk. Flood-affected farming areas offer a vivid illustration. When several years pass without a major flood, farmers start to underestimate the actual probability. And after a run of bad prices, many of them become overly cautious, expecting the worst even when conditions have improved. Tversky and Kahneman [30] would recognise these patterns as instances of the availability heuristic, first described outside agriculture. Among farming populations, though, these cognitive shortcuts have outsized consequences. They help account for the well-documented fact that farmers frequently make risk management decisions that do not line up with what economic models would predict.

Several studies from around the world have attempted to rank which types of risk farmers worry about most. Meuwissen, Huirne, and Hardaker [31], working with Dutch livestock producers, found production risk and price risk at the top of the list; institutional risk was less prominent but was gaining ground. Palinkas and Szekely [32] saw weather risk dominating the concerns of Central European farmers who had been through droughts and floods. In Australia, Greiner, Patterson, and Miller [33] studied dryland farmers and unsurprisingly found drought at the centre of their production worries. An additional finding from that study is worth flagging: farmers who had income coming in from off-farm work tended to rate production risks lower than those whose livelihoods depended entirely on farming. That observation matters here because 78.7 per cent of the respondents in the present sample report more than one source of household income. That kind of diversification could partly account for why perceived risk in this sample spreads across several categories rather than clustering around a single dominant type.

Hagos and Geta [34] reviewed smallholder commercialisation in Ethiopia and found that farmers' willingness to invest in market-linked crops was strongly conditioned by how capable they felt of managing the risks involved. Social capital played a significant role. Networks within farmer organisations and relationships with extension workers functioned as an informal risk management mechanism. They provided information about market conditions and distributed the costs of bad outcomes across group members. Fafchamps and Minten [35] documented similar patterns among agricultural traders in Madagascar. Barrett [3] reached a comparable conclusion in his review of market participation among African smallholders. The practical implication is that promoting market orientation without simultaneously building the social and institutional infrastructure that makes agricultural risk-taking less devastating for resource-poor households is unlikely to succeed.

Ullah, Shivakoti, Zulfiqar, and Kamran [36] developed a typology of farm risks and showed how business risk and financial risk interact, creating compounded vulnerability. Take a farmer who borrows to invest in a market-oriented vegetable crop. If the crop fails, that is production risk. If the price drops between planting and harvest, that is market risk. The loan, meanwhile, has to be repaid regardless of the outcome. That is financial risk. These three risks do not simply coexist; they compound one another. Ullah et al. call this a poverty trap dynamic. The farmers who would benefit most from market orientation, typically those in the BPL and AAY categories, also face the highest combined risk from attempting it. Without institutional protection, they pull back. In rural India, Jha and Gupta [37] found a

related pattern: climate risk perceptions and willingness to invest in adaptation varied significantly with education level, extension access, and existing asset base. Lien, Flaten, Ebbesvik, Koesling, and Valle [38] and Campenhout, Bizimungu, and Birungi [39] drew attention to institutional risk, showing that when government support policies become less predictable, farmer investment in market-oriented production declines.

2.3 Agripreneurship, Farmer Typologies, and the North-Eastern Indian Context

Agripreneurship as a research area coalesced in the early 2000s, when scholars started bringing together ideas from entrepreneurship studies and agricultural economics. Vesala, Peura, and McElwee [19] did some of the earliest systematic work on this, asking how farmers construct their identities as entrepreneurs. What they found was that portfolio farmers, the ones juggling agricultural and non-agricultural businesses simultaneously, had a notably stronger sense of themselves as entrepreneurs. They were also more growth-oriented and less risk-averse than farmers who stuck purely to cultivation. McElwee [18] introduced a distinction that has proved quite handy: farm-based entrepreneurs keep their focus on agricultural production, whereas rural entrepreneurs use the farm as a base from which to branch out into other business lines. In the present study, the three farmer categories roughly follow this spectrum. Agricultural Entrepreneurs are closest to the commercial pole, while Farmers and Progressive Farmers fall somewhere in the middle.

Shane and Venkataraman [40] defined entrepreneurship around opportunity: seeing it, evaluating it, and going after it. That is what sets an entrepreneur apart from someone who simply runs an existing operation well. The entrepreneur notices gaps others walk past. When you apply this to farming, it means an Agricultural Entrepreneur is doing more than just producing efficiently. This individual is looking for new crops that might sell, experimenting with processed products, or working out selling arrangements nobody in the area has tried before. Bairwa, Lakra, Kushwaha, Meena, and Kumar [41] brought this thinking into an Indian context and laid out what agripreneurs actually need to succeed: capital, decent inputs, workable technology, management ability, and connections to markets. Of all these, two kept coming up as the hardest barriers to clear in rural India: getting hold of capital and making meaningful market connections.

The North-East poses problems that the wider Indian agripreneurship literature has not dealt with adequately. Assam's agricultural economy is a hard setting for enterprise. Inheritance keeps splitting landholdings into unviably small fragments, a large share of cultivated land has no proper documentation of ownership, and the connections between what small farmers grow and what organised markets want remain thin. Individual ambition is not lacking; plenty of farmers want to become agripreneurs. But ambition alone gets people nowhere when the institutional framework that should support them does not exist. Conditions in the peri-urban belt around Guwahati, which closely resembles the field sites of the present study, show the same pattern. Farmers who want to sell to urban buyers face concentrated wholesale buying, an almost complete absence of cold storage at the farm

level, and heavy costs for moving perishables on roads that monsoon flooding damages every year. In the Brahmaputra valley, the real barriers to commercial farming have to do with missing infrastructure and weak institutions, not with farmers lacking motivation or the right mindset.

Patel and Chavda [42] looked at rural entrepreneurship in multiple Indian states and kept finding the same two constraints at the top of the list: not enough capital and not enough market access. From West Africa, Uche and Familusi [43] reached essentially the same conclusion. Building agripreneurship takes collective effort, institutional support, and real money spent on market infrastructure. One motivated farmer, however skilled, cannot do it alone. The overall direction of the literature has been moving this way for some time now. Explanations that once put individual farmer characteristics at the centre have been gradually replaced by analyses that give more weight to structural conditions, the roads, the markets, the credit systems, the extension networks, that determine whether farmers can participate in commercial agriculture at all.

In South Asia, smallholder research has been widening its lens. Where earlier work concentrated mainly on farm size and technology adoption, more recent studies have brought gender, age, and social identity into the analysis [44, 45]. Doss [45] reviewed how gender shapes agricultural decisions across developing countries and painted a sobering picture for women smallholders: limited freedom to travel, social norms that complicate bargaining with male traders, and unequal access to credit and information all constrain their ability to participate in markets. This study does not disaggregate by gender. The sample is dominated by male-headed households, which makes a meaningful gender comparison impossible with the data at hand. Investigating gender dimensions of market orientation and risk perception in Kamrup district is something future research ought to take up.

3. Materials and Methods

3.1 Study Area

The study was conducted in the Hajo and Sualkuchi development blocks of Kamrup district, Assam, India. Both blocks are located in the lower Brahmaputra valley, within 30 to 60 km of Guwahati, the region's principal commercial centre. Hajo is characterised by a diversified agricultural base, active participation in weekly rural markets, and relatively higher educational attainment among farming households. Sualkuchi is known for its traditional silk weaving industry, which coexists with smallholder agricultural production; farmers in this block typically combine cultivation income with artisanal or wage income, and show higher online information access alongside lower income-expenditure surpluses than their Hajo counterparts. Both blocks are flood-prone, with seasonal Brahmaputra inundation creating significant production risk variability across years.

3.2 Sampling and Data Collection

A multi-stage purposive and random sampling design was employed. In the first stage, Kamrup district was selected based on its agricultural significance and proximity to Guwahati's consumer markets. In

the second stage, Hajo and Sualkuchi blocks were selected purposively to represent contrasting market access conditions within the same district. In the third stage, two Gram Panchayats were selected from each block using simple random sampling, and two villages were drawn from each Gram Panchayat, yielding eight study villages: Bamundi, Bangalpara, Bhalukghata, and Kalitakuchi (Hajo); and Bongshar, Pub Sualkuchi, Silkuchi, and Kumarpara (Sualkuchi). In the fourth stage, a household listing was conducted in each village and respondents were selected from farming households that were actively engaged in agricultural production and marketing, with 35 to 40 respondents per village and 150 per block (N = 300).

Primary data were collected between June and September 2025 through structured household interview schedules administered via the Kobo Collect android application. The schedule was pretested, translated into Assamese, and administered through face-to-face interviews with the principal farming household member. It covered six thematic domains: demographic and socio-economic characteristics; farming practices; market orientation (four dimensions, four-point ordinal scale); marketing behaviour (strategy, product form, and channel); perceived risk (six categories, multiple response); and media exposure to agricultural information (five channels, four-point ordinal scale).

3.3 Variable Construction and Analysis

Market orientation was measured across four dimensions: responsiveness to customer needs, quality product orientation, demand-driven cropping, and advance supply arrangements. Each was scored on a four-point scale (1 = Very Low, 2 = Low, 3 = Medium, 4 = High). A composite Market Orientation (MO) score was computed as the unweighted mean of the four dimension scores (range 1 to 4). As the four dimensions capture distinct facets of market-oriented behaviour rather than a single latent construct, the composite was treated as a formative behavioural indicator rather than a reflective psychometric scale. Perceived risk was captured as a multiple-response item across six categories, with each category coded as a binary indicator. Media exposure was assessed on the same four-point scale across five channels, with a composite score ranging from 5 to 20.

Statistical analysis was conducted in R. Descriptive statistics (frequencies, means, standard deviations) were computed for all variables. Welch's independent samples t-tests (two-tailed) compared block-level scores and proportions. One-way ANOVA tested MO score differences across farmer categories. Pearson's correlation coefficient assessed linear associations between continuous variables. An alpha level of 0.05 was used for significance testing throughout.

4. Results

4.1 Respondent Profile

The sample comprises 300 farming households with a mean age of 44.7 years (SD = 14.1). Educational attainment spans from illiterate (19.0%) through post-graduation (14.0%), with high school level as the modal category (21.0%). Hajo block has a higher share of graduates and post-graduates (36.0%)

compared to Sualkuchi (23.3%). Three farmer categories are represented: Agricultural Entrepreneurs (29.3%), Farmers (35.0%), and Progressive Farmers (35.7%), with the category mix differing between blocks (Farmers: 24.0% in Hajo vs. 46.0% in Sualkuchi). Socio-economic status (SES) classification based on government ration card categories yields 34.0% Non Poor (APL), 36.0% Poor (BPL), and 30.0% Very Poor (AAY) households, with Very Poor (AAY) households more prevalent in Hajo (37.3%) than in Sualkuchi (22.7%). Mean monthly household income is Rs. 27,756 for Hajo and Rs. 25,956 for Sualkuchi. Farming practices show no significant inter-block differences: 59.0% of respondents practise round-the-year farming, 40.7% use double cropping, and 56.0% adopt new crop varieties with some regularity.

4.2 Market Orientation Across Dimensions

Table 1 presents the mean scores on each market orientation dimension by development block, with t-test results for block comparisons. Figure 1 displays these means graphically.

Table 1
Market Orientation Dimension Scores by Development Block

MO Dimension	Hajo (n = 150) Mean	Hajo SD	Sualkuchi (n = 150) Mean	Sualkuchi SD	t	p	Sig.
Customer Responsiveness	2.59	1.15	2.56	1.00	0.21	0.830	ns
Quality Orientation	2.49	1.11	3.01	1.16	-3.98	< 0.001	***
Demand-Driven Cropping	2.53	1.15	2.63	0.92	-0.84	0.404	ns
Advance Supply	2.40	1.23	2.55	1.10	-1.14	0.255	ns
Composite MO Score	2.50	0.58	2.69	0.54	-2.91	0.004	**
Note: MO scores on a 1 (Very Low) to 4 (High) scale. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ns = not significant. Source: Primary survey data.							

Quality product orientation is the only individual dimension that differs significantly between blocks (Hajo: 2.49, SD = 1.11 vs. Sualkuchi: 3.01, SD = 1.16; $t = -3.98$, $p < 0.001$), with Sualkuchi farmers showing markedly stronger quality consciousness. The composite MO score is also significantly higher in Sualkuchi (2.69 vs. 2.50; $t = -2.91$, $p = 0.004$). Customer responsiveness and advance supply show no significant block differences. One-way ANOVA reveals a statistically significant difference in composite MO scores across farmer categories ($F = 3.57$, $p = 0.030$), with Progressive Farmers (mean = 2.66, SD = 0.56) and Farmers (2.64, SD = 0.56) scoring higher than Agricultural Entrepreneurs (2.46, SD = 0.56). Figure 2 displays the distribution of MO scores across farmer categories.

4.3 Socio-Economic Profile and Its Relationship with Market Orientation

Table 2 presents the cross-classification of farmer category and socio-economic status.

Table 2
Farmer Category by Socio-Economic Status (N = 300)

Farmer Category	Non Poor (APL)	Poor (BPL)	Very Poor (AAY)	Total
Agricultural Entrepreneurs	24 (27.3)	31 (35.2)	33 (37.5)	88 (100.0)
Farmers	37 (35.2)	42 (40.0)	26 (24.8)	105 (100.0)
Progressive Farmers	41 (38.3)	35 (32.7)	31 (29.0)	107 (100.0)
Total	102 (34.0)	108 (36.0)	90 (30.0)	300 (100.0)
Note: Figures in parentheses are percentages. Source: Primary survey data (2025).				

Agricultural Entrepreneurs are disproportionately concentrated in the Very Poor (AAY) category (37.5%) and Poor (BPL) category (35.2%), together accounting for 72.7% of this farmer group. Progressive Farmers have the highest Non Poor (APL) share (38.3%). Pearson’s correlation analysis reveals no statistically significant relationship between the composite MO score and monthly household income ($r = -0.017$, $p = 0.768$), monthly expenditure ($r = -0.045$, $p = 0.439$), or land holding size ($r = 0.012$, $p = 0.836$). These results indicate that H1 and H2 are not supported by the data.

4.4 Marketing Strategy and Channel Use

Table 3
Marketing Strategy Adopted and Market Channel Use by Development Block

Category	Hajo (n = 150) n (%)	Mean	Sualkuchi (n = 150) n (%)	Mean	t	p
Panel A: Marketing Strategy						
Immediately after Harvest	35 (23.3)	0.23	63 (42.0)	0.42	-3.51	< 0.001***
Wait for High Demand	49 (32.7)	0.33	26 (17.3)	0.17	3.11	0.002**
Value Addition and Marketing	33 (22.0)	0.22	35 (23.3)	0.23	-0.28	0.784 ns
Storage and Marketing	33 (22.0)	0.22	26 (17.3)	0.17	1.02	0.309 ns
Panel B: Market Channels (Multiple Response)						
Weekly Market	47 (31.3)		69 (46.0)			
Through Distributors	43 (28.7)		54 (36.0)			
Through Middle Man	48 (32.0)		47 (31.3)			
Farm Gate	49 (32.7)		40 (26.7)			
Village Local Market	36 (24.0)		48 (32.0)			
Int'l Market (via Dept.)	47 (31.3)		34 (22.7)			
Nearby City Area	43 (28.7)		35 (23.3)			
<i>Note: Panel A mean = binary proportion per category (binary t-test, df = 298). Panel B = multiple response; percentages exceed 100%. ***p < 0.001, **p < 0.01. Source: Primary survey data.</i>						

Sualkuchi farmers sell immediately after harvest at a significantly higher rate than Hajo farmers (42.0% vs. 23.3%; $t = -3.51$, $p < 0.001$). Conversely, Hajo farmers more frequently wait for high demand before selling (32.7% vs. 17.3%; $t = 3.11$, $p = 0.002$). Weekly markets are the dominant channel overall (38.7%), with distributors (32.3%) and middle men (31.7%) constituting important secondary routes. Semi-processed products are the most commonly sold form (52.7%), followed by raw products (46.0%) and processed products (43.3%).

4.5 Perceived Risk

Table 4
Perceived Risk Categories by Development Block (Multiple Response)

Risk Category	Hajo (n = 150) n (%)	Sualkuchi (n = 150) n (%)	Total (N = 300) n (%)
Production Risk	61 (40.7)	68 (45.3)	129 (43.0)
Personal Risk	44 (29.3)	66 (44.0)	110 (36.7)
Financial and Credit Risk	55 (36.7)	49 (32.7)	104 (34.7)
Technology Risk	51 (34.0)	46 (30.7)	97 (32.3)
Institutional Risk	56 (37.3)	39 (26.0)	95 (31.7)
Price or Market Risk	49 (32.7)	34 (22.7)	83 (27.7)
<i>Note: Multiple responses permitted; column percentages exceed 100%. Source: Primary survey data.</i>			

Production risk is the most widely perceived type across both blocks (43.0% overall). Personal risk shows the largest block divergence, with Sualkuchi farmers reporting significantly higher prevalence (44.0% vs. 29.3% in Hajo). Financial and credit risk (34.7% overall) is more prevalent in Hajo (36.7%). Institutional risk (31.7% overall) is also more prominent in Hajo (37.3% vs. 26.0%). Price or market risk is the least frequently identified type (27.7%), and is notably lower in Sualkuchi (22.7%).

4.6 Media Exposure to Agricultural Information

The composite media exposure score is 12.43 (SD = 2.45) in Hajo and 12.17 (SD = 2.39) in Sualkuchi, both at approximately 62% of the maximum possible score (range 5 to 20).

Farmer clubs are the most consistently accessed channel in both blocks (Hajo: 52.0%; Sualkuchi: 54.0%). The most pronounced block divergence is in online source exposure, where 58.0% of Sualkuchi respondents report meaningful access compared to 44.0% in Hajo. Radio and print media show higher prevalence in Hajo (51.3% and 48.0% respectively).

5. Discussion

The results of this study need to be considered in light of what is already known about agricultural market orientation and perceived risk, and also in terms of where they depart from expectations.

The quality orientation divergence between blocks was the sharpest result in the dataset (Sualkuchi: 3.01 vs. Hajo: 2.49; $p < 0.001$). Hajo has higher household incomes, so one might have expected Hajo farmers to score higher on all market orientation dimensions. They did not. A possible explanation lies in Sualkuchi's silk-weaving heritage. Product quality is deeply valued in weaving, and this has been the case for generations. It is plausible that quality norms cultivated in textile production have carried over into how farming households in the block think about agricultural quality. Sheth and Parvatiyar [46] made the case that when communities are deeply embedded in craft-based value chains, the quality

consciousness developed there tends to spill over into other domains, including agriculture. A methodological note is in order here, though. Every single respondent in Kumarpara village reported high quality orientation, which pulls up the Sualkuchi block average. That kind of village-level uniformity is unusual and deserves scrutiny in follow-up studies.

Selling behaviour looked quite different across the two blocks. In Sualkuchi, farmers overwhelmingly sold their produce right after bringing it in from the fields, while Hajo farmers more commonly held back, waiting for prices to rise. This is not surprising. The risk literature has documented how cash shortages and the absence of storage options push farmers into distress selling [36]. Kumarpara is perhaps the clearest illustration of this in the dataset. It has the lowest income surplus in the sample (Rs. 1,775 per month on average). When household cash needs are immediate and no storage facility exists, selling at whatever post-harvest price is available is the rational choice, regardless of how market-oriented the farmer's thinking may be. Barrett [3] argued that asset endowments and transaction costs, rather than preferences, are what drive smallholder market participation decisions. The present data support that argument.

Neither of the two hypotheses found support in the data. The correlation between the composite market orientation score and monthly household income turned out to be statistically non-significant ($r = -0.017$, $p = 0.768$). This null finding is the most telling result of the study. It should not be read as evidence that market orientation does not matter for farm income. A more careful interpretation is that, under the specific conditions found in Kamrup district, structural bottlenecks get in the way before market orientation can translate into higher earnings. Storage options are scarce. Farmers have little choice but to go through intermediaries. Holdings are simply too small to generate bargaining power. Each of these constraints blocks the expected link between how farmers think about markets and what they actually earn. Narayanan [13] and Birthal et al. [14] documented comparable structural obstacles, and Narayanan's evidence that gains from high-value agriculture accrue mainly to better-resourced farmers points to a similar dynamic here. Day's [21] capability framework explains the disconnect. Wanting to be market-oriented is not the same as being able to act on it. If the capabilities are missing, if a farmer cannot sense price trends or negotiate with channel partners, then holding the right attitude produces no real benefit.

It may seem counterintuitive that 72.7 per cent of Agricultural Entrepreneurs in this sample fall into the Very Poor (AAY) and Poor (BPL) categories, but earlier research on agripreneurship has documented the same thing. The transition into portfolio farming costs money upfront, and returns lag behind [19, 41, 43]. The ANOVA ($F = 3.57$, $p = 0.030$) threw up something else worth noting. Progressive Farmers scored higher on market orientation than the Agricultural Entrepreneurs did, which is the opposite of what one might expect. A likely explanation is that Progressive Farmers receive government extension support along with subsidised inputs. This backing reduces their financial exposure when trying out commercially oriented practices, unlike entrepreneurs who are going it alone and bearing all the risk themselves. Patrick and Musser [29] found that financial constraints strongly shape how farmers handle risk, and the pattern in this dataset fits that argument.

The socio-economic profile of the Agricultural Entrepreneurs also speaks to a distinction that entrepreneurship research has long considered fundamental: whether entry into enterprise is driven by opportunity or by necessity. Shane and Venkataraman [40] place the discovery and pursuit of opportunity at the centre of entrepreneurship, and most agripreneurship writing in India carries this optimistic framing [41]. The entrepreneurs in this sample do not fit it. Nearly three quarters of them fall in the Poor and Very Poor categories, their mean household income (Rs. 25,098) is the lowest of the three farmer groups, and their market orientation scores sit significantly below those of Progressive Farmers. These markers point to necessity-driven diversification rather than opportunity pursuit: households add poultry, piggery, or petty trade to farming because a single livelihood cannot carry them, not because they have identified a gap in the market. Rural entrepreneurship in Kamrup district appears to be less a vehicle of accumulation than a coping strategy.

This reading complicates findings from wealthier institutional settings. Vesala, Peura and McElwee [19] reported that portfolio farmers in Finland held a stronger entrepreneurial identity, greater growth orientation, and lower risk aversion than conventional producers. In Kamrup the pattern inverts: the portfolio operators trail the specialised Progressive Farmers on market orientation. McElwee's [18] taxonomy suggests why. His rural entrepreneur, who uses the farm as a base for wider business activity, presumes some slack of capital and time that can be redeployed. Where no such slack exists, diversification fragments scarce resources across ventures instead of compounding them, and breadth substitutes for depth. What looks like entrepreneurial behaviour from the outside may involve none of the capabilities, in Day's [21] sense, that make such behaviour profitable.

The results also suggest a boundary condition for the well-replicated finding that market orientation and entrepreneurial orientation are complementary [23, 24, 25]. That complementarity has been demonstrated almost entirely in firms operating within functioning markets, with storage, credit, and enforceable contracts available in the background. In their absence, the two orientations appear to decouple. The Agricultural Entrepreneurs display venturing behaviour without market-responsive production; the Progressive Farmers display market-responsive production without independent venturing, cushioned as they are by extension support and subsidised inputs. Watson [47] has argued that entrepreneurial action can only be understood within its institutional setting, and the Kamrup data illustrate the point: the same behaviours that compound advantage in a thick institutional environment merely spread risk in a thin one.

The risk results are broadly in line with what international research has documented about how farming households experience vulnerability across multiple fronts simultaneously [17, 31, 33]. Production risk came first, but it did not dominate to the exclusion of everything else. The biggest between-block gap turned up in personal risk: 44.0% of Sualkuchi farmers flagged it, versus just 29.3% in Hajo. Dillon and Scandizzo [26] pointed out long ago that farming systems heavily reliant on human labour make farmers more anxious about their own health and physical ability to work. That observation appears to hold here too. Meanwhile, the comparatively low reporting of price risk in Sualkuchi (22.7%) makes sense given that farmers there overwhelmingly sell right after harvest. Selling immediately takes price uncertainty off

the table, but the trade-off is that these farmers routinely accept lower prices than they might get if they could afford to wait.

5.1 Contribution to the Entrepreneurship Literature

Three contributions to the entrepreneurship literature follow. The first is empirical. Smallholder entrepreneurs in North-Eastern India are almost absent from the international entrepreneurship record, and the data reported here document a case in which membership of an entrepreneurial category is decoupled from both market orientation and household income. This runs against the expectation, derived from studies such as Mirzaei et al. [6], that entrepreneurially oriented farm businesses will also be the more market-oriented and better-performing ones.

The second is theoretical. The findings qualify the market orientation and entrepreneurial orientation complementarity thesis by specifying the conditions under which it fails: where storage, credit, and organised buyers are missing, venturing and market responsiveness no longer reinforce each other. They likewise extend the necessity-opportunity distinction into the agripreneurship domain, showing that portfolio farming in a subsistence setting is better modelled as risk-spreading under constraint than as opportunity exploitation. Klein and Cook [48], reading T. W. Schultz, note that returns to entrepreneurial ability depend on complementary markets; the Kamrup evidence is a field demonstration of that dependency.

The third contribution concerns the direction of support. Progressive Farmers, who receive extension backing and subsidised inputs, outperform unsupported entrepreneurs on market orientation. Institutional scaffolding, not entrepreneurial identity, appears to be what converts market awareness into market behaviour in this setting. For a literature that often treats the entrepreneur's attributes as the binding constraint, this is a useful corrective: in environments like rural Assam, the constraint is the missing infrastructure around the entrepreneur, and programmes that promote entrepreneurship without it may push poor households toward the compounded risks that Ullah et al. [36] describe rather than out of poverty.

6. Conclusion and Policy Implications

What this study has done is pull together structured, field-based data on market orientation and risk perception among smallholder farmers in Hajo and Sualkuchi blocks of Kamrup district, Assam. The findings have something to say to both ongoing theoretical conversations and on-the-ground policy decisions.

Several findings stand out. Sualkuchi farmers reported significantly stronger quality orientation than Hajo farmers, despite earning less on average, a pattern that may trace back to the silk-weaving heritage of that block. When it came to selling, Sualkuchi farmers were much more likely to sell right away after harvest, while Hajo farmers tended to wait for better prices. Neither hypothesis found statistical support. The composite market orientation score had no meaningful correlation with household income, which

points to structural obstacles breaking the chain between market awareness and actual earnings. Among farmer categories, Progressive Farmers registered higher market orientation than Agricultural Entrepreneurs, possibly because of the government support they receive. Production risk was the most widely reported risk type in both blocks. Personal, financial, technological, institutional, and price risks trailed at varying rates, and the pattern differed between blocks.

For entrepreneurship research, the study's central message is that entrepreneurial categories travel poorly across institutional contexts. The Agricultural Entrepreneurs of Kamrup district are necessity-driven portfolio operators whose venturing is decoupled from market orientation and income, and the complementarity between entrepreneurial and market orientations reported in developed-economy firms does not hold in this setting. Entrepreneurship in smallholder agriculture is contingent on the institutional infrastructure that surrounds it, which is precisely what the policy measures below address.

For policy, a few priorities are clear. Sualkuchi block needs cold storage at the Gram Panchayat level more than anything else. The farmers there are not selling immediately because they do not understand markets. They are selling immediately because they have no place to store anything. Extension work should look different in the two blocks. Hajo farmers would benefit from help in building formal relationships with buyers and setting up advance contracts. Sualkuchi farmers need better access to price information and guidance on when to sell. Agricultural Entrepreneurs face a distinct challenge: they need working capital to survive the early phase of their transition, when they are spending more than they earn. Farmer Producer Organisations deserve serious promotion in both blocks. They could pool storage, share market intelligence, and negotiate directly with buyers, exactly the kind of collective mechanism that Ton et al. [7] and Hagos and Geta [34] identified as effective in comparable settings.

Some limitations should be noted. A cross-sectional design cannot establish causation; it shows associations at a single point in time. Working within just two blocks of a single district obviously limits how broadly one can generalise. And the market orientation scores come from what farmers told us, not from direct observation of their actual selling behaviour. Future studies should try to supplement these self-reports with transaction-level data. Two lines of inquiry seem particularly worth pursuing going forward. First, women's participation in Assam's agriculture has been growing, and a study that disaggregates market orientation and risk perception by gender in Kamrup district would be genuinely valuable. Second, Farmer Producer Organisations could potentially serve as the institutional link that connects market-oriented thinking to better actual incomes. Whether they do, and under what conditions, is something this study could not answer but that subsequent research should test directly.

Declarations

Acknowledgements

This work was supported by a Seed Funding Research Grant from Assam down town University, Guwahati. The author is deeply grateful to the 300 farming households across Bamundi, Bangalpara, Bhalukghata, Kalitakuchi, Bongshar, Pub Sualkuchi, Silkuchi, and Kumarpara who gave their time and

shared their experiences during lengthy interviews. Thanks are also due to the Gram Panchayat officials in Hajo and Sualkuchi blocks for helping arrange access to the study villages.

Author contributions

The sole author designed the study, carried out the fieldwork, analysed the data, and wrote the manuscript.

FUNDING

This study was funded under Seed Grant Project by Assam down town University. Grant ID: AdtU/Seed/2023/075.

Data availability

The data underlying this study can be obtained from the corresponding author upon reasonable request.

Ethics approval and consent to participate

This study was approved by the Institutional Ethics Committee of Assam down town University, Guwahati, Assam India. Grant ID: AdtU/Seed/2023/075. The research was conducted in accordance with the ethical guidelines of the approving committee. All participants were adults who voluntarily agreed to participate.

The study involved structured interviews with adult members of farming households. Informed consent was obtained from all participants before each interview.

CONSENT FOR PUBLICATION

Not applicable.

Competing interests

No conflicts of interest are declared by the author in connection with this research.

References

1. FAO. The state of food and agriculture 2023: Revealing the true cost of food. Food and Agriculture Organisation of the United Nations; 2023.
2. IFAD. Creating opportunities for rural youth: Rural development report 2019. International Fund for Agricultural Development; 2019.
3. Barrett CB. Smallholder market participation: Concepts and evidence from eastern and southern Africa. Food Policy. 2008;33(4):299–317. <https://doi.org/10.1016/j.foodpol.2007.10.005>.

4. Pingali P. (2010). Agriculture renaissance: Making Agricultural for Development work for the 21st century. In P. Pingali & R. Evenson, editors, *Handbook of agricultural economics* (Vol. 4, pp. 3867–3894). Elsevier. [https://doi.org/10.1016/S1574-0072\(09\)04074-2](https://doi.org/10.1016/S1574-0072(09)04074-2)
5. Reardon T, Echeverria R, Berdegue J, Minten B, Liverpool-Tasie S, Tschirley D, Zilberman D. Rapid transformation of food systems in developing regions: Highlighting the role of agricultural research and innovations. *Agric Syst.* 2019;172:47–59. <https://doi.org/10.1016/j.agsy.2018.01.022>.
6. Mirzaei O, Micheels ET, Boecker A. Product and marketing innovation in farm businesses: The role of entrepreneurial and market orientation. *Int Food Agribusiness Manage Rev.* 2016;19(2):99–130. <https://doi.org/10.22004/ag.econ.234888>.
7. Ton G, Vellema W, Desiere S, Weituschat S, D’Haese M. Contract farming for improving smallholder incomes: What can we learn from effectiveness studies? *World Dev.* 2018;104:46–64. <https://doi.org/10.1016/j.worlddev.2017.11.015>.
8. Verhofstadt E, Maertens M. Smallholder cooperatives and agricultural performance in Rwanda: Do organisational differences matter? *Agric Econ.* 2014;45(S1):39–52. <https://doi.org/10.1111/agec.12128>.
9. Kohli AK, Jaworski BJ. Market orientation: The construct, research propositions, and managerial implications. *J Mark.* 1990;54(2):1–18. <https://doi.org/10.2307/1251866>.
10. Narver JC, Slater SF. The effect of a market orientation on business profitability. *J Mark.* 1990;54(4):20–35. <https://doi.org/10.2307/1251757>.
11. Government of India. *Agricultural statistics at a glance 2022*. Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare; 2022.
12. Chand R. *Market and trade reforms for agriculture*. Government of India: NITI Aayog; 2020.
13. Narayanan S. Profits from participation in high value agriculture: Evidence of heterogeneous benefits in vegetable farming in India. *Food Policy.* 2014;46:56–69. <https://doi.org/10.1016/j.foodpol.2014.02.003>.
14. Birthal PS, Roy D, Negi DS. Assessing the impact of crop diversification on farm poverty in India. *World Dev.* 2015;72:70–92. <https://doi.org/10.1016/j.worlddev.2015.02.015>.
15. Gulati A, Sharma P, Ganguly K. (2018). *Distortions to agricultural incentives in India (Agricultural Distortions Working Paper 116)*. World Bank.
16. Government of Assam. *Economic survey of Assam 2021–22*. Directorate of Economics and Statistics. Government of Assam; 2022.
17. Hardaker JB, Lien G, Anderson JR, Huirne RBM. *Coping with risk in agriculture: Applied decision analysis*. 3rd ed. CABI; 2015.
18. McElwee G. A taxonomy of entrepreneurial farmers. *Int J Entrepreneurship Small Bus.* 2008;6(3):465–78. <https://doi.org/10.1504/IJESB.2008.019139>.
19. Vesala KM, Peura J, McElwee G. The split entrepreneurial identity of the farmer. *J Small Bus Enterp Dev.* 2007;14(1):48–63. <https://doi.org/10.1108/14626000710727096>.

20. Slater SF, Narver JC. Does competitive environment moderate the market orientation-performance relationship? *J Mark.* 1994;58(1):46–55. <https://doi.org/10.2307/1252107>.
21. Day GS. The capabilities of market-driven organizations. *J Mark.* 1994;58(4):37–52. <https://doi.org/10.2307/1251915>.
22. Singh S. New markets for smallholders in India: Exclusion, policy and governance. *Economic Political Wkly.* 2012;47(52):95–105.
23. Baker WE, Sinkula JM. The complementary effects of market orientation and entrepreneurial orientation on profitability in small businesses. *J Small Bus Manage.* 2009;47(4):443–64. <https://doi.org/10.1111/j.1540-627X.2009.00278.x>.
24. Alsughayir A. The effect of entrepreneurial orientation and market orientation on business performance. *Eur J Bus Manage.* 2016;8(15):78–87.
25. Nur NHM, Salim M. Market orientation and business performance: Small medium enterprise perspective. *Int J Bus Manage.* 2014;9(6):173–80. <https://doi.org/10.5539/ijbm.v9n6p173>.
26. Dillon JL, Scandizzo PL. Risk attitudes of subsistence farmers in Northeast Brazil: A sampling approach. *Am J Agric Econ.* 1978;60(3):425–35. <https://doi.org/10.2307/1239939>.
27. Just RE, Pope RD. Production function estimation and related risk considerations. *Am J Agric Econ.* 1979;61(2):276–84. <https://doi.org/10.2307/1239732>.
28. Ayinde OE. (2016). Risk analysis in innovation system: A case-study of production of Vitamin A cassava variety among farmers in Nigeria. Paper presented at the Fifth International Conference of the African Association of Agricultural Economists, Addis Ababa, Ethiopia.
29. Patrick GF, Musser WN. Sources of and responses to risk: Factor analyses of large-scale US cornbelt farmers. In: Huirne RBM, Hardaker JB, Dijkhuizen AA, editors. *Risk management strategies in agriculture: State of the art and future perspectives.* Wageningen Agricultural University; 1997. pp. 45–53.
30. Tversky A, Kahneman D. Judgment under uncertainty: Heuristics and biases. *Science.* 1974;185(4157):1124–31. <https://doi.org/10.1126/science.185.4157.1124>.
31. Meuwissen MPM, Huirne RBM, Hardaker JB. Risk and risk management: An empirical analysis of Dutch livestock farmers. *Livest Prod Sci.* 2000;69(1):43–53. [https://doi.org/10.1016/S0301-6226\(00\)00247-5](https://doi.org/10.1016/S0301-6226(00)00247-5).
32. Palinkas P, Székely C. Farmers' perceptions on risk and crisis risk management. In: Meuwissen MPM, van Asseldonk MAPM, Huirne RBM, editors. *Income stabilization in European agriculture: Design and economic impact of risk management tools.* Wageningen Academic; 2008. pp. 97–122.
33. Greiner R, Patterson L, Miller O. Motivation, risk perceptions and adoption of conservation practices by farmers. *Agric Syst.* 2009;99(2–3):86–104. <https://doi.org/10.1016/j.agsy.2008.10.003>.
34. Hagos A, Geta E. Review on smallholders' agriculture commercialization in Ethiopia: What are the driving factors to focus on? *J Dev Agricultural Econ.* 2016;8(4):65–76. <https://doi.org/10.5897/JDAE2015.0699>.

35. Fafchamps M, Minten B. Returns to social network capital among traders. *Oxf Econ Pap.* 2002;54(2):173–206. <https://doi.org/10.1093/oep/54.2.173>.
36. Ullah R, Shivakoti GP, Zulfiqar F, Kamran MA. Farm risks and uncertainties: Sources, impacts and management. *Outlook Agric.* 2016;45(3):199–205. <https://doi.org/10.1177/0030727016665440>.
37. Jha CK, Gupta V. Farmer's perception and factors determining the adaptation decisions to cope with climate change: An evidence from rural India. *Environ Sustain Indic.* 2021;10., Article 100112. <https://doi.org/10.1016/j.indic.2021.100112>.
38. Lien G, Flaten O, Ebbesvik M, Koesling M, Valle PS. (2003). Risk and risk management in organic and conventional dairy farming: Empirical results from Norway. Paper presented at the 14th Congress of the International Farm Management Association, Perth, Australia.
39. Campenhout BV, Bizimungu E, Birungi D. (2016). Risk and sustainable crop intensification: The case of smallholder rice and potato farmers in Uganda (IFPRI Discussion Paper 1521). International Food Policy Research Institute.
40. Shane S, Venkataraman S. The promise of entrepreneurship as a field of research. *Acad Manage Rev.* 2000;25(1):217–26. <https://doi.org/10.2307/259271>.
41. Bairwa SL, Lakra K, Kushwaha S, Meena LK, Kumar P. Agripreneurship development as a tool to upliftment of agriculture. *Int J Sci Res Publications.* 2014;4(3):1–4.
42. Patel B, Chavda K. Rural entrepreneurship in India: Challenge and problems. *Int J Adv Res Comput Sci Manage Stud.* 2013;1(2):28–37.
43. Uche C, Familusi L. The adoption of agripreneurship as a mitigating measure to unemployment in Nigeria: A topical review. *Global J Manage Bus Res.* 2018;18(2):25–31.
44. Alderman H, Paxson CH. (1992). Do the poor insure? A synthesis of the literature on risk and consumption in developing countries (Policy Research Working Paper No. WPS1008). World Bank.
45. Doss C. Women and agricultural productivity: Reframing the issues. *Dev Policy Rev.* 2018;36(1):35–50. <https://doi.org/10.1111/dpr.12243>.
46. Sheth JN, Parvatiyar A. The evolution of relationship marketing. *Int Bus Rev.* 1995;4(4):397–418. [https://doi.org/10.1016/0969-5931\(95\)00018-6](https://doi.org/10.1016/0969-5931(95)00018-6).
47. Watson TJ. Entrepreneurship in action: Bringing together the individual, organizational and institutional dimensions of entrepreneurial action. *Entrepreneurship Reg Dev.* 2013;25(5–6):404–22. <https://doi.org/10.1080/08985626.2012.754645>.
48. Klein PG, Cook ML. T. W. Schultz and the human-capital approach to entrepreneurship. *Rev Agric Econ.* 2006;28(3):344–50. <https://doi.org/10.1111/j.1467-9353.2006.00297.x>.

Figures

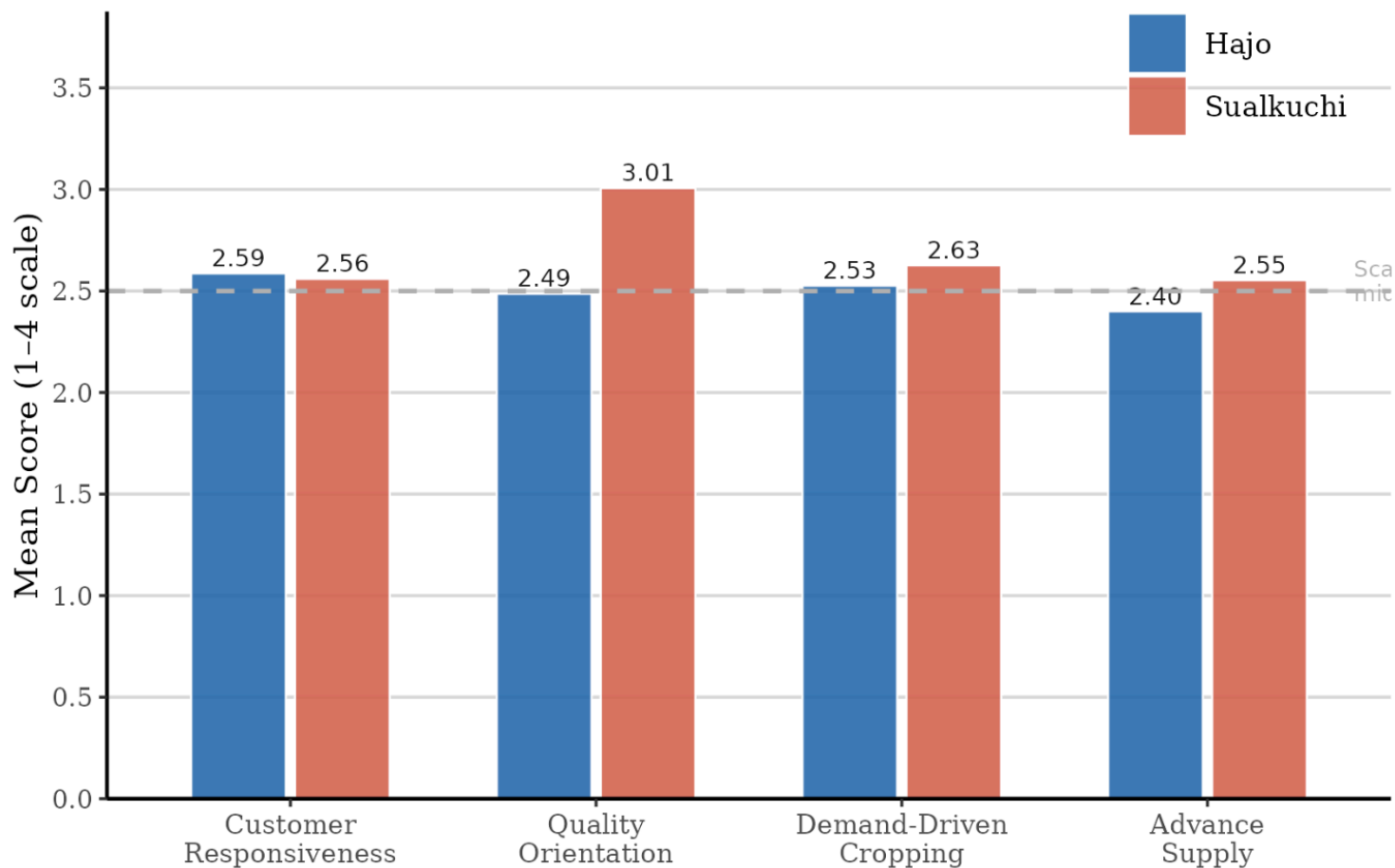


Figure 1

Mean market orientation scores by dimension and development block. The dashed line marks the scale midpoint (2.5). Quality orientation is the only dimension that diverges significantly between blocks ($p < 0.001$), with Sualkuchi farmers scoring substantially higher (mean = 3.01) than Hajo farmers (mean = 2.49)

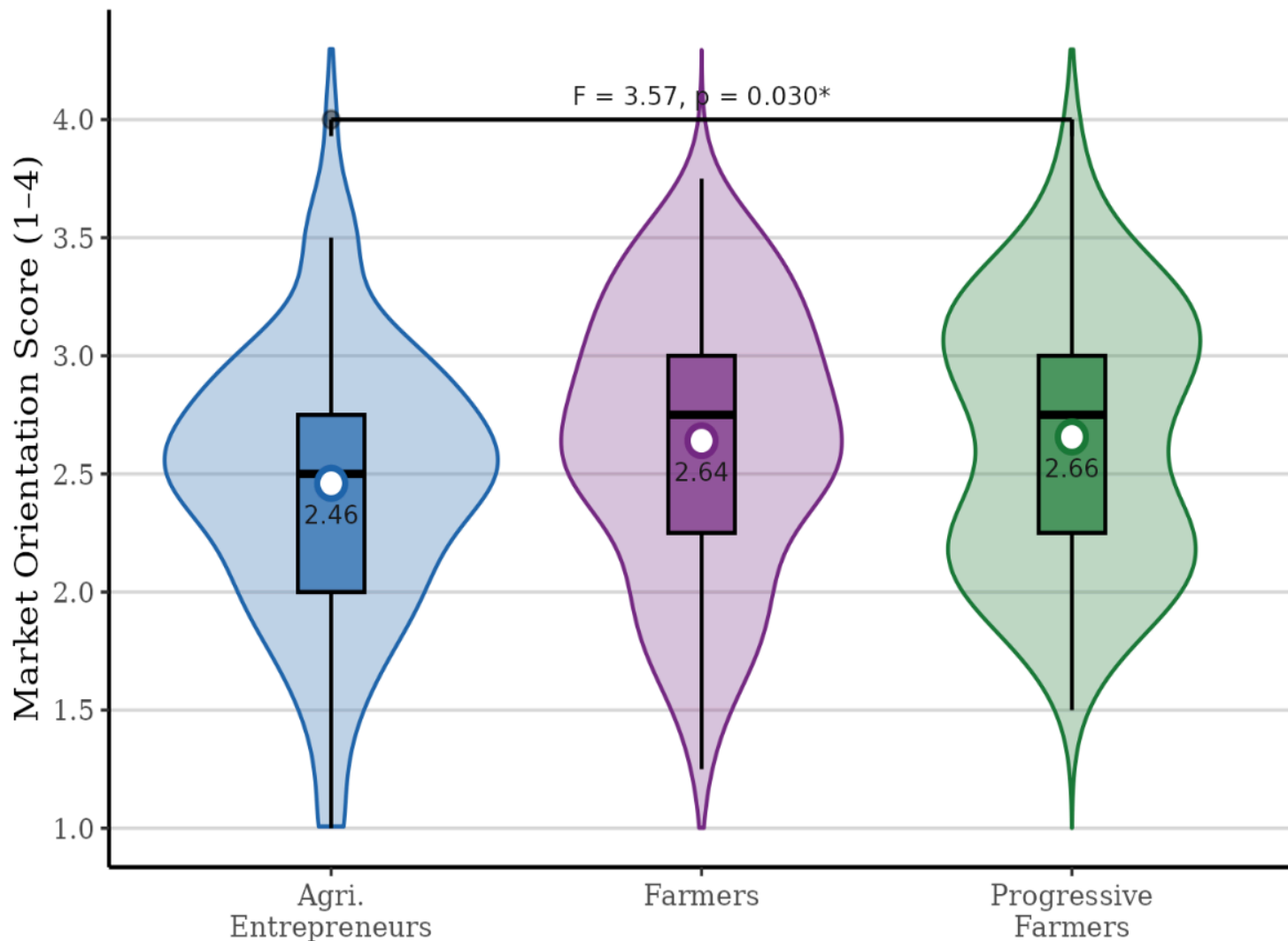


Figure 2

Distribution of composite market orientation scores by farmer category (violin plots with embedded box plots). White circles indicate category means. Agricultural Entrepreneurs show the lowest mean MO score (2.46) and the widest variance. The ANOVA bracket indicates a statistically significant difference across categories ($F = 3.57, p = 0.030$)

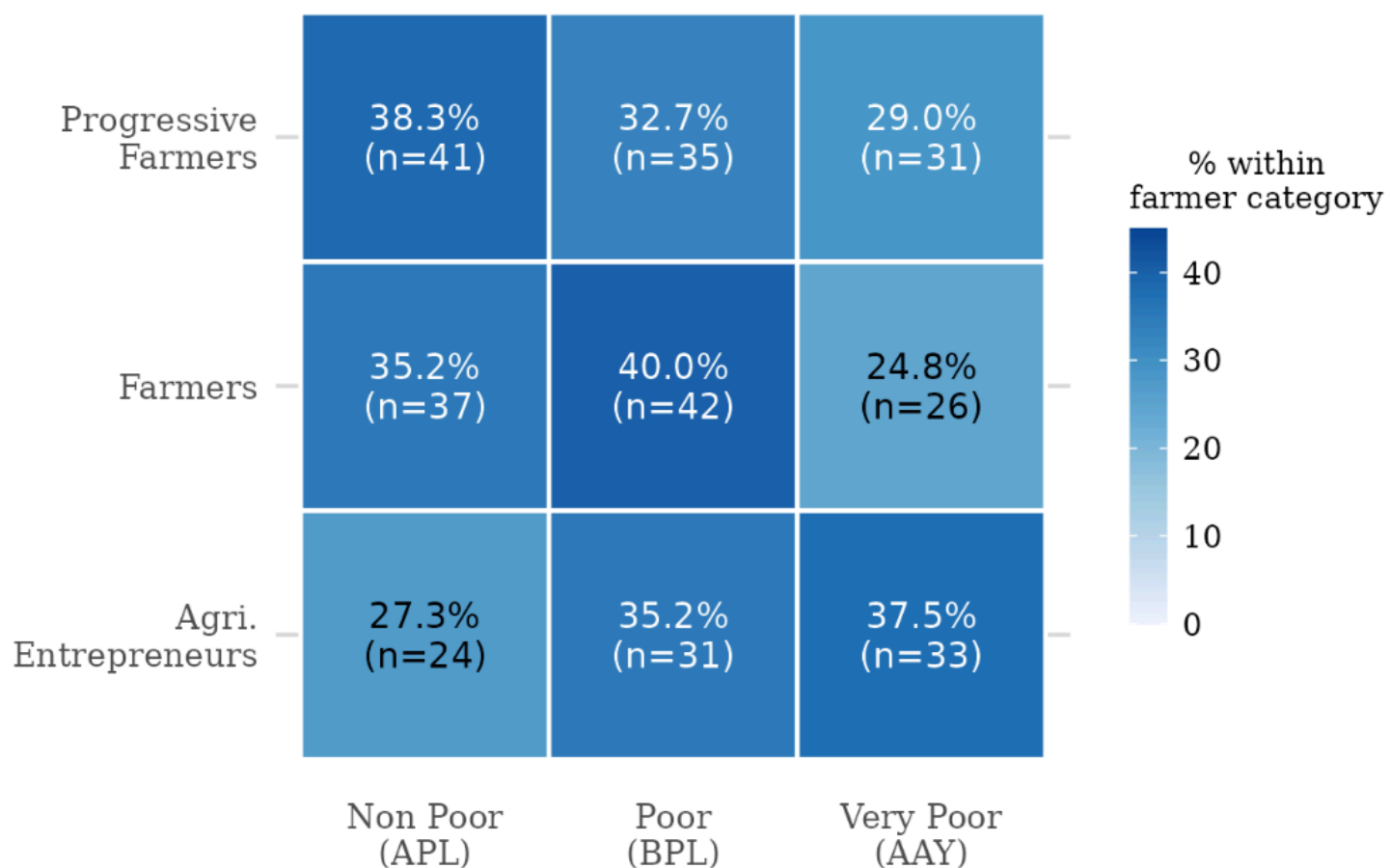


Figure 3

Heat map of SES distribution within farmer categories. Cell values show percentage within row and absolute count. Agricultural Entrepreneurs show the highest concentration in the Very Poor (AAY) category (37.5%, $n = 33$), while Progressive Farmers have the highest Non Poor (APL) share (38.3%, $n = 41$)

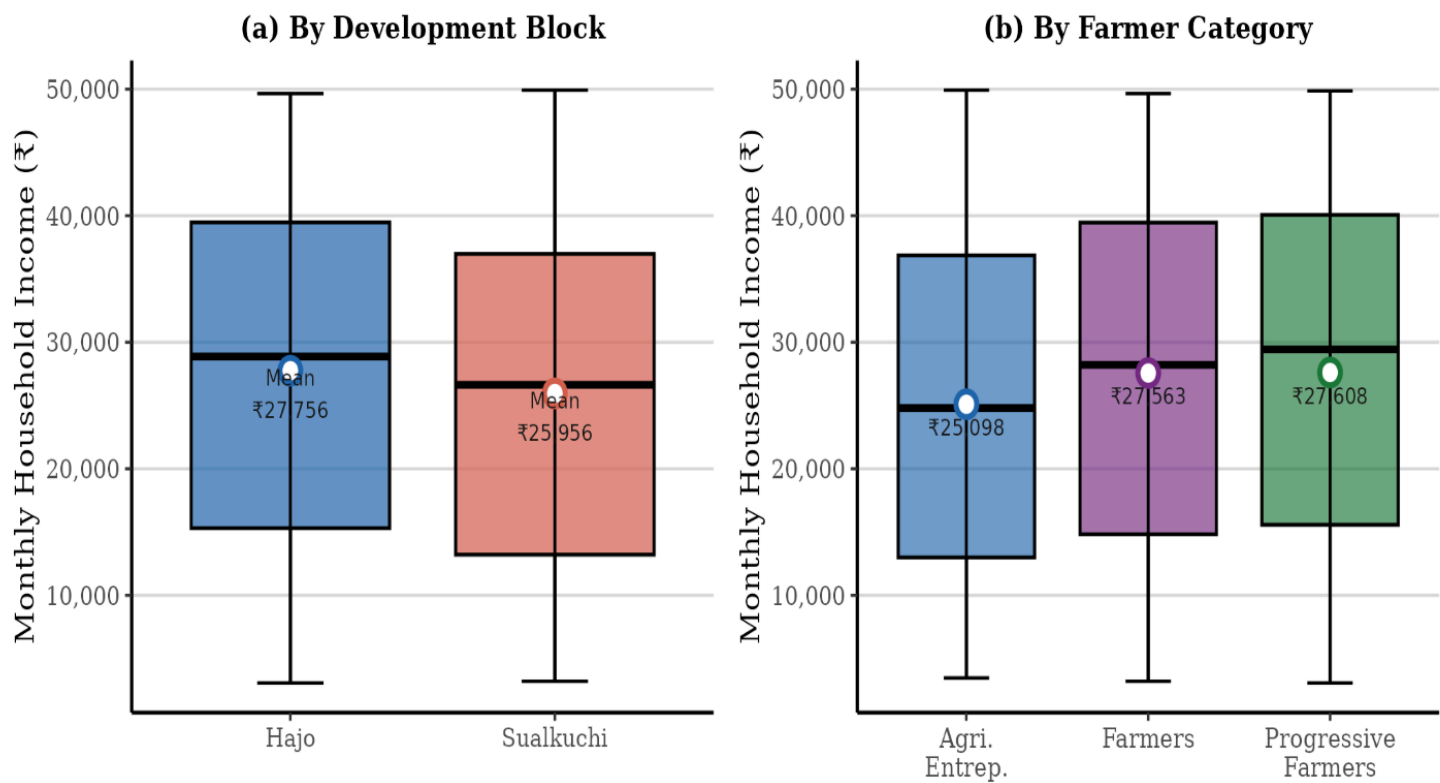


Figure 4

Box plots of monthly household income (Rs.) by (a) development block and (b) farmer category. Hajo block shows a higher mean income (Rs. 27,756) than Sualkuchi (Rs. 25,956). Income differences across farmer categories are modest, with Agricultural Entrepreneurs showing the lowest mean (Rs. 25,098)

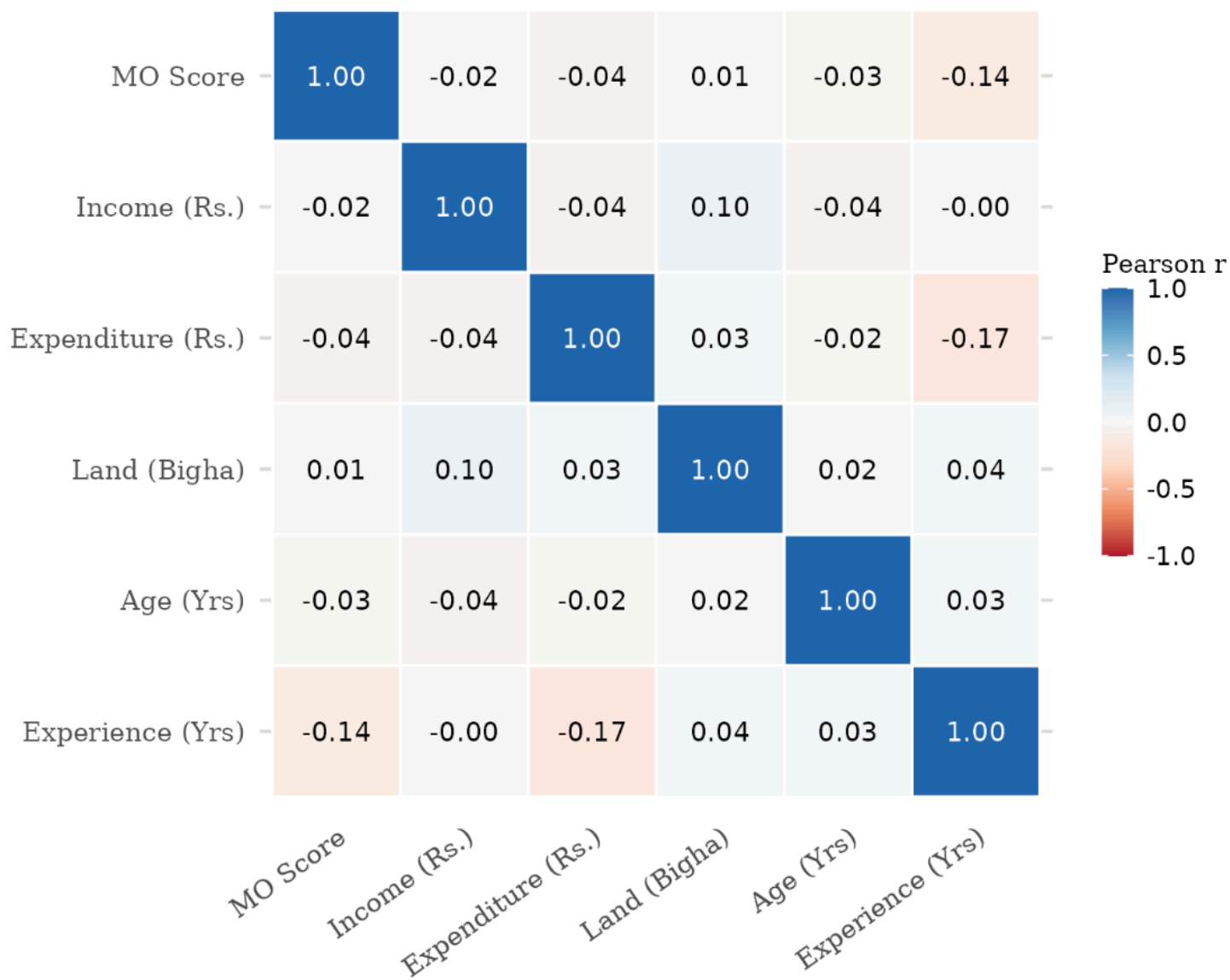


Figure 5

Pearson correlation matrix for key continuous variables. No correlation involving the composite MO score reaches statistical significance at $p < 0.05$. The strongest correlation is between monthly household income and the income–expenditure balance ($r = 0.78$, $p < 0.001$)

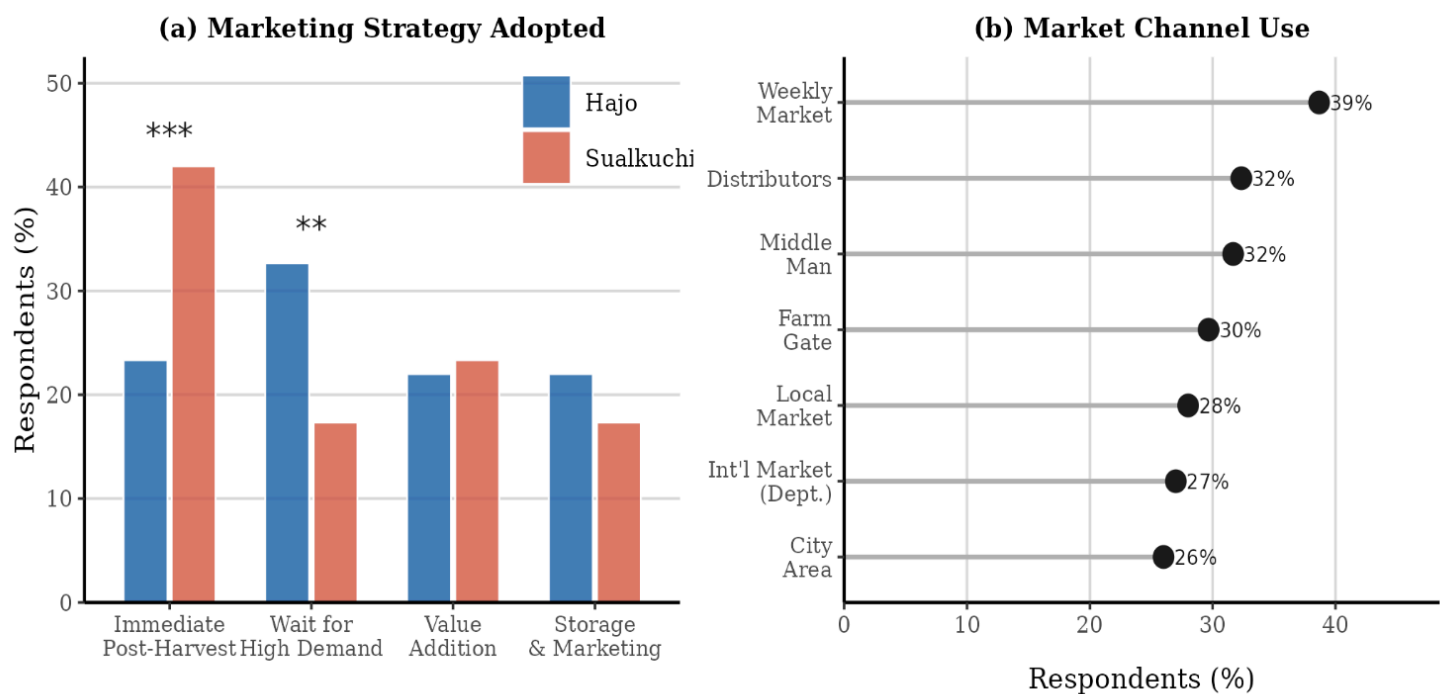


Figure 6

(a) Marketing strategy adopted by development block (%) with significance stars for block differences. (b) Market channel use by total sample (lollipop chart, % of respondents). Weekly market dominates channel use (38.7%), followed by distributors (32.3%) and middle men (31.7%)

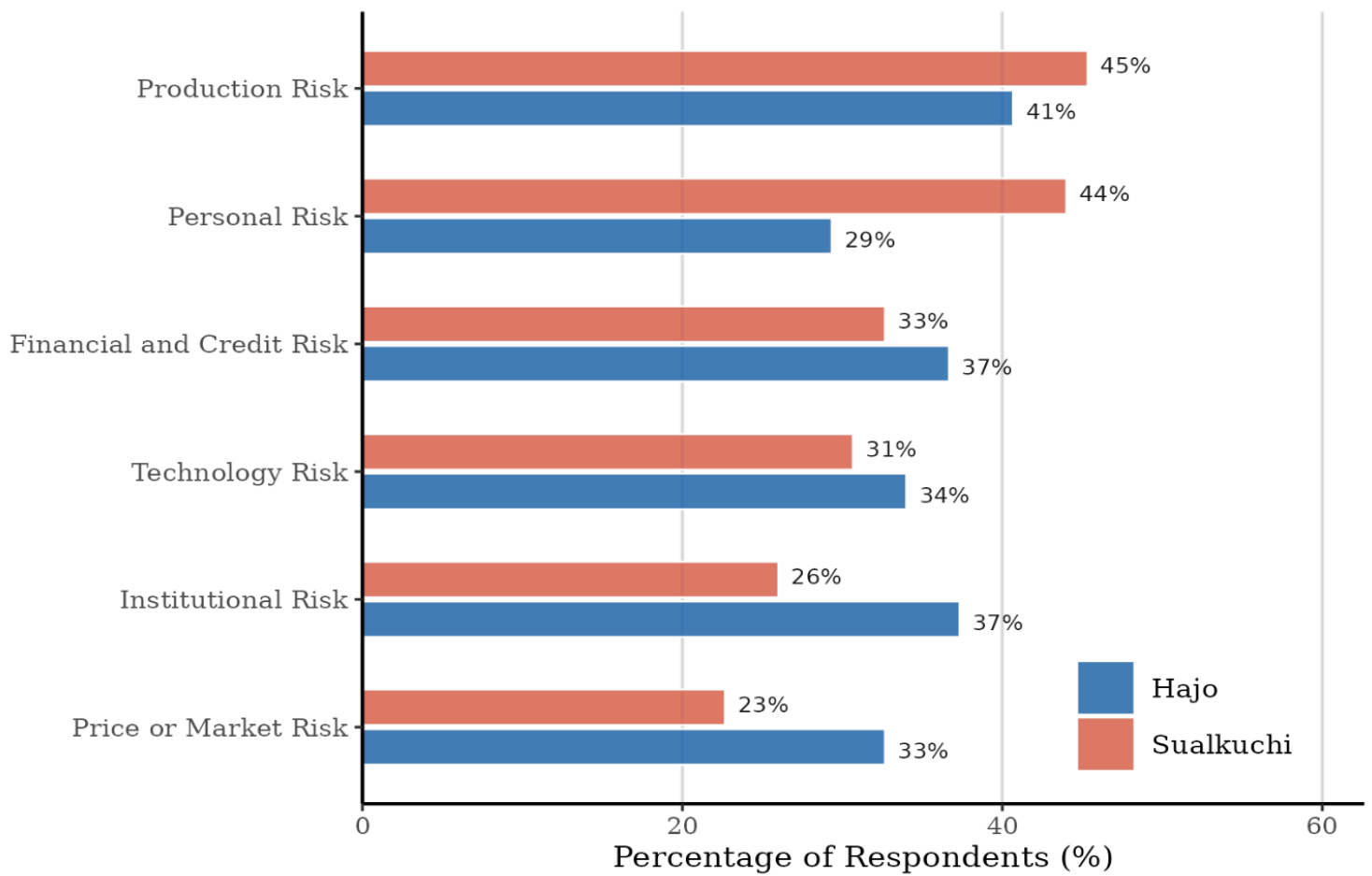


Figure 7

Perceived risk by category and development block (% of respondents identifying each risk type). Production risk is the most widely identified type in both blocks. Personal risk shows the largest block divergence, with Sualkuchi substantially higher (44.0% vs. 29.3%)

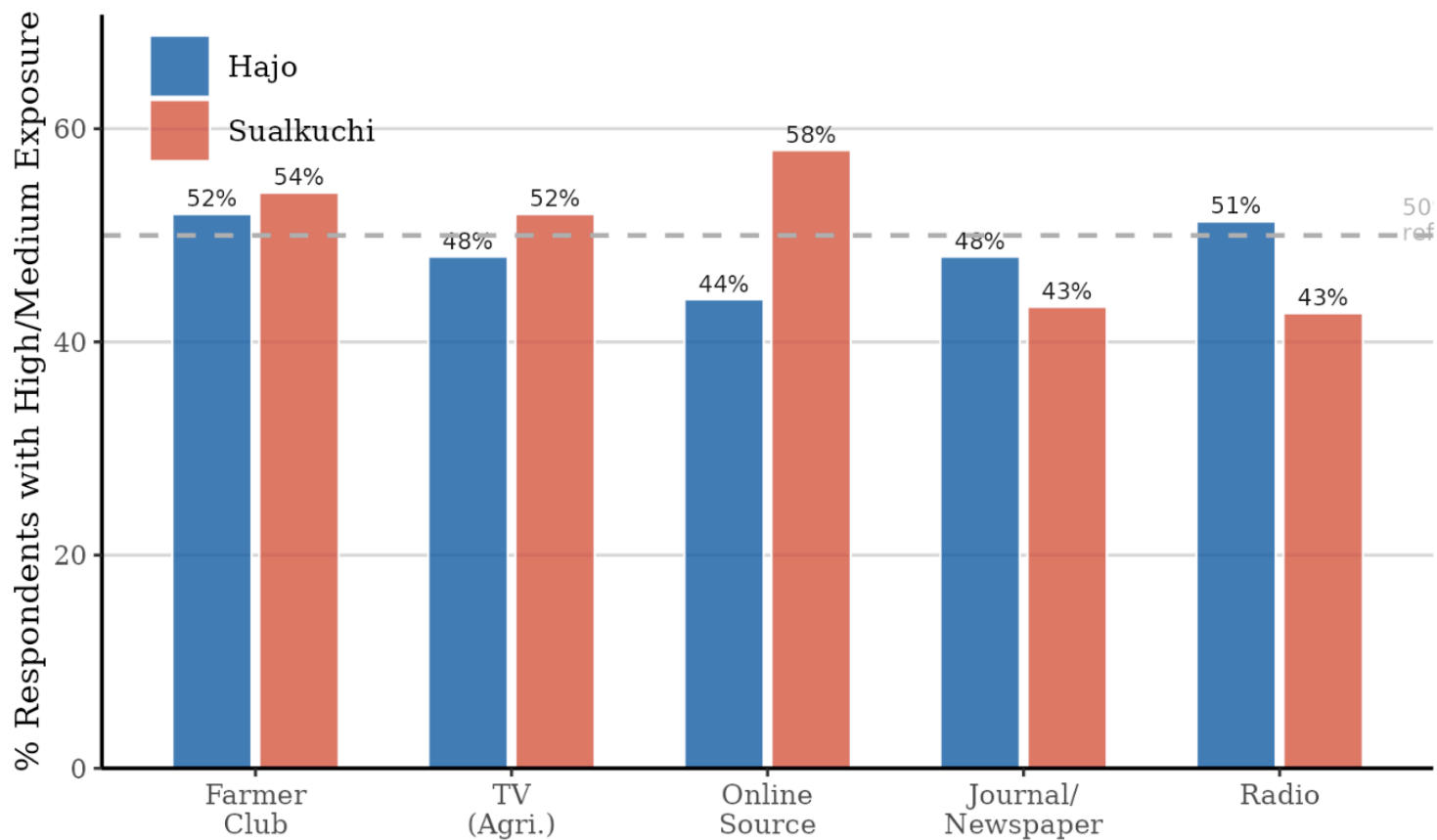


Figure 8

Agricultural information channel use by development block (% of respondents with High or Medium exposure). Sualkuchi shows substantially higher online source exposure (58.0% vs. 44.0% in Hajo), while Hajo leads on radio (51.3% vs. 42.7%) and journal and newspaper (48.0% vs. 43.3%)