A Systematic Review of the Theory of Planned Behavior: Methodological Foundations, Empirical Performance, and Modern Extensions in Agribusiness

Wong Kelly Kai Seng*

*Department of Agribusiness and Bioresource Economics, Faculty of Agriculture,

Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

*ผู้ประสานงาน: Wong Kelly Kai Seng อีเมล์: kellywong@upm.edu.my

ABSTRACT

The Theory of Planned Behavior (TPB) is a prominent and widely applied psychological framework for predicting and understanding human behavior. This systematic review provides a comprehensive analysis of the model's foundations, its empirical performance, its established limitations, and the primary extensions proposed to address these critiques. Developed by Icek Ajzen as an extension of the Theory of Reasoned Action, the TPB posits that a person's behavioral intention, which is the most direct predictor of action, is shaped by their attitude toward the behavior, subjective norms, and perceived behavioral control. While meta-analyses confirm the model's strong predictive validity for intentions, the report critically examines its enduring limitations, including the persistent intention-behavior gap, its rationalistic focus that overlooks non-volitional factors such as habit and emotion, and the often-weak predictive power of its subjective norm construct. The review synthesizes significant advancements in the literature, detailing the incorporation of additional variables, such as moral norms, self-identity, and past behavior, to enhance explanatory power. It highlights the practical utility of implementation intentions in bridging the gap between intention and action. The report concludes that the TPB serves as a robust foundational framework that has continuously evolved through extensions to account for the complexities of human conduct.

Keywords: Theory of Planned Behavior; agribusiness; agricultural economics; farmers' decisions; food consumption; sustainability; technology adoption.

1. Introduction

Understanding why farmers, firms, and consumers do what they do lies at the heart of agribusiness and agricultural economics. Production choices (e.g., adopting precision agriculture), organizational participation (e.g., joining cooperatives), and consumption decisions (e.g., purchasing organic or animal-welfare-friendly products) are not determined by prices and constraints alone; beliefs, norms, perceived control, and self-regulatory strategies also shape them.

The Theory of Planned Behavior (TPB) provides a parsimonious psychological framework for modeling these determinants [2] It posits that behavioral intention—the most proximal determinant of behavior—arises from attitude toward the behavior, subjective norm, and perceived behavioral control (PBC), with PBC also exerting a possible direct effect on behavior when actual control is imperfect. Across domains, meta-analyses show TPB's strong performance in predicting intentions and more moderate performance for behaviors [7] In agriculture, this gap is particularly pronounced: farm decisions unfold in volatile biophysical environments, characterized by seasonal liquidity cycles, thin input and output markets, and social structures (such as households, cooperatives, and extension networks) that influence how beliefs and norms are translated into action. As a result, TPB's parsimonious architecture—while valuable often requires agri-specific extensions (e.g., moral norms about stewardship, identity as a "good farmer" habit from intergenerational practices) and implementation intentions to close the intention–behavior gap.

This review synthesizes TPB applications in agribusiness and agricultural economics. We (i) outline TPB's foundations with agri-focused examples; (ii) systematically assess empirical applications to production, organization, and consumption; (iii) critically examine limitations when ported to agricultural contexts; and (iv) evaluate extensions with demonstrated value in this field. We conclude with research and policy directions for integrating TPB with economic constraints and program design. Figure 1 presents the PRISMA flow; Figure 2 depicts the classic model;

Figure 3 proposes an extended agribusiness version; and Figure 4 links major critiques to corrective extensions.

2. Systematic Review Methodology

2.1 Protocol and eligibility criteria

Followed PRISMA principles for identification, screening, eligibility, and inclusion. Studies were eligible if they: (a) were peer-reviewed, (b) written in English, (c) explicitly operationalized at least one of the cores TPB constructs (attitude, subjective norm, PBC, intention) and modelled their linkages to behavior or intention, and (d) addressed agribusiness/agricultural economics domains: farm production/adoption, agri-food organizational behavior (e.g., cooperatives, supply chains), or agri-food consumption. In this study, the excluded criteria are based on the situation of purely qualitative TPB mentions without operationalization; theoretical pieces without empirical tests; non-agri-food settings; and conference abstracts without sufficient data.

2.2 Information sources and search strategy

This review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines [29] to ensure methodological transparency, replicability, and completeness.

Electronic searches were conducted in Scopus, Web of Science, ScienceDirect, and AGRICOLA from January 1990 to March 30 2025 to capture all peer-reviewed publications applying the Theory of Planned Behavior (TPB) in agribusiness or agricultural economics contexts. Search terms were adapted for each database using Boolean operators:

"Theory of Planned Behavior" OR TPB) AND (Agriculture OR Agribusiness OR Farmers OR "Rural Households" OR "Farming Practices") AND ("Food Consumption" OR "Sustainable Practices" OR "Green Technology" OR Adoption OR "Precision Agriculture" OR "Cooperative" OR "Organic".

Google Scholar was used to identify supplementary grey literature such as working papers and institutional reports. All searches and screening decisions were recorded in Zotero for auditability.

2.3 Screening and selection

The search identified 362 records. After de-duplication (n = 64), 298 titles/abstracts were screened. 226 were excluded (not agri-food; lacked TPB constructs; insufficient empirical detail). 72 full texts were assessed; 45 met the inclusion criteria and were retained. Figure 1 (PRISMA) visualizes this flow.
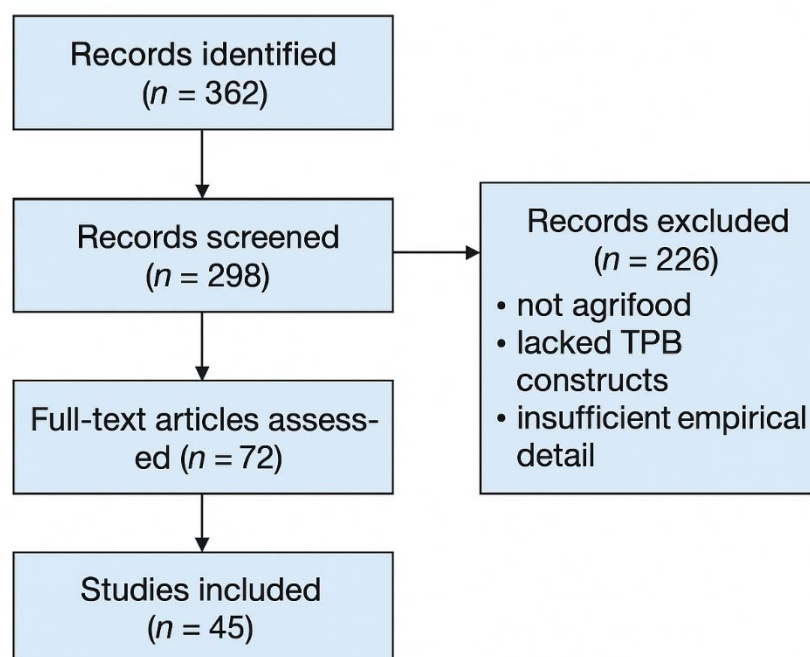

Figure 1. PRISMA Flow Diagram

2.4 Data extraction and synthesis

For each study, extracted the following information: context, sample, measurement of TPB constructs, modelling approach, effect sizes (when available), and main findings [3] A standardized form captured the publication year, country, behavioral context, sample size, measurement of TPB constructs, model type, reported effect sizes, and additional variables (e.g., moral norms, self-identity, habit). Extraction was performed independently by two reviewers, and discrepancies were resolved through discussion [4][5]

Evidence was synthesized narratively and quantitatively. For quantitative insights, descriptive statistics of variance explained (adjusted R^2) and standardized

coefficients (β) were summarized from meta-analyses and primary studies. When available, effect sizes were converted to standardized β values to enable cross-study comparison. A second-stage thematic synthesis mapped the empirical findings onto major TPB critiques and modern extensions (Figures 3 and 4).

2.5 Delimitation: Rationale for TPB Focus

While the TPB is one of many frameworks for understanding behavior, this review focuses specifically on its application due to its demonstrated empirical performance and adaptability. Some alternative models, such as the Value-Belief-Norm (VBN) model, which focuses on moral components in environmental behaviors, are rejected by empirical data as a standalone model. Studies have shown that the TPB model has a better fit to empirical data and a greater capacity to predict behavior than the VBN model, even for pro-environmental actions [1] The TPB's strength lies in its comprehensive yet flexible structure, which allows for the integration of factors from other theories, such as moral norms, while maintaining a robust core architecture [6]

2.6 Methodological Transparency Statement

Full search strings, inclusion logs, and the list of 45 retained studies are available upon request to promote open-science transparency.

3. Foundations of the Theory of Planned Behavior (Agribusiness Focus)

3.1 Core constructs and pathways

TPB frames intention as a function of (i) attitude (instrumental/cognitive and affective evaluations of the behavior's outcomes), (ii) subjective norms (perceived social pressure to perform or not), and (iii) perceived behavioral control (perceived ease/difficulty, akin to self-efficacy and perceived constraints). PBC can also directly influence behavior when perceived control tracks actual control [2] In agriculture, attitude encompasses beliefs about profitability, yield stability, soil health, and reputational benefits; subjective norms reflect expectations from spouses, elders, peer farmers, cooperative leaders, extension agents, buyers, and local authorities; PBC captures access to credit, inputs, machinery, labor, extension knowledge, and

weather/timing risk. These constructs align naturally with economic constraints and social structure in rural contexts [12]

3.2 Measurement considerations in farm and food settings

Standard TPB practice tailors' items to the behavior, target, context, and time (TACT) specification [3], e.g., "I intend to adopt conservation tillage on my main maize plot this coming season." Agricultural applications must account for seasonality, multi-period horizons, household decision-making units, and risk. Disaggregating injunctive vs. descriptive norms and affective vs. cognitive attitudes often yields sharper predictions [10] Where resource constraints are salient, separating internal control (skills/knowledge) from external control (credit, input availability, rainfall) improves construct validity. Figure 2 shows the classic example of adopting organic fertilizer and enrolling in a cooperative input scheme.
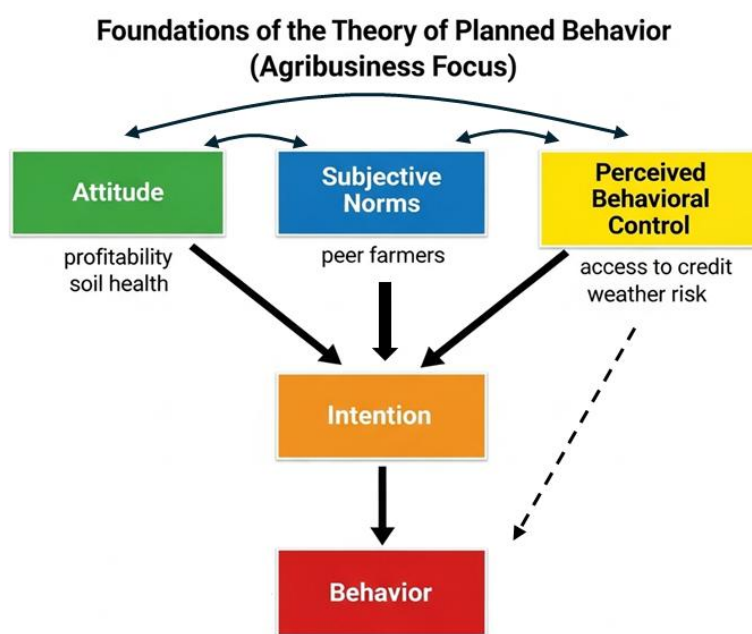

Figure 2. Classic Theory of Planned Behavior in Agriculture

4. Empirical Applications in Agribusiness and Agricultural Economics

Across 45 included studies, TPB constructs consistently explained a sizable proportion of intentions (often 40–50%), with smaller but meaningful explanatory

power for behaviors (25–35%), consistent with broader meta-analytic patterns [7],[16] We organize findings into three clusters.

4.1 Production and technology adoption

Applications include adoption of conservation tillage, precision agriculture, organic/low-input practices, integrated pest management, drought-tolerant varieties, and on-farm renewable energy [17] Studies typically report attitude and PBC as the strongest predictors of intention; PBC often carries a direct effect on behavior when access to capital or inputs is binding. Subjective norms are mixed—stronger where cooperatives, buyer standards, or tight social networks operate; weaker where farming is individualized and market-driven.

For precision agriculture, PBC mediated the effects of training and service availability on both intentions and uptake. Research on technology adoption also found that perceived capacity and self-efficacy were important predictors of both intended and actual adoption [9] studied the adoption of precision agriculture technologies have showed that attitudes and PBC significantly increase farmers' adoption intention.

For soil and water conservation, moral norms about stewardship strengthened intentions beyond economic attitudes; habit (conventional tillage routines) dampened behavioral change unless paired with concrete action planning [18] Adding moral norms can increase the explained variance for intention, with some studies showing an increase of 7% beyond the standard TPB constructs, and an extended model has been shown to explain 81.3% of the variance in farmers' intention for a specific conservation practice [8]

Organic conversion intentions were driven by attitudes about soil health and price premiums and by perceived control over certification and input access; identity as an "environmentally responsible farmer" moderated attitude–intention links [36]

Renewable energy adoption (biogas/solar pumps) reflected strong roles for PBC (credit and technical support) and descriptive norms from neighbors' visible installations [39]

4.2 Organizational behavior and market participation

TPB has been applied to cooperative membership, contract farming participation, and traceability/quality certification. Here, subjective norms (leaders, peers) and identity (community-oriented farmer) weigh more heavily, and PBC reflects transaction costs (transport, paperwork), compliance capacity, and bargaining position.

Cooperative participation intentions increased with injunctive norms (leaders' approval) and identity as a "community farmer"; PBC captured perceived administrative burdens [21]

Contract farming participation coupled with attitude (price stability, technical support) and PBC (counterparty risk, dispute resolution capacity) with moral norms (fair dealing, reputation) [37] One study on farmers' intention to join cashew marketing cooperatives found that moral norms and perceived behavioral control were significant factors, underscoring the role of ethical considerations and ease of joining [23]

Certification schemes (Global G.A.P., organic, fair trade) revealed attitude–intention links via market access beliefs, with PBC capturing documentation capacity and audit readiness; implementation intentions improved follow-through for first-time audits [30]

4.3 Consumer behavior in agri-food markets

On the demand side, TPB explains intentions to purchase organic, fair-trade, animal-welfare, local, or eco-labelled foods [25] Across these studies, moral norms and self-identity ("green consumer") frequently augment TPB, boosting explanatory power. Habit moderates the intention–behavior link, especially for weekly grocery routines. The inclusion of additional variables like moral norms, past behavior, and self-identity can increase the explained variance for intention by an average of 12.1% and for behavior by 10.5% [41]

Eco-label purchases: moral norms (environmental concern) and identity consistently predict intentions beyond attitude; PBC reflects affordability/availability (e.g., store assortments) [11]

Animal-welfare choices: affective attitude and anticipated emotions (e.g., guilt and pride) predict intentions [19]

Local food purchases: descriptive norms (what others do) often outweigh injunctive norms [24] Implementation intentions (shopping lists, store choice) strengthen follow-through.

4.4 Summary table of applications

Table 1. Applications of the Theory of Planned Behavior in Agribusiness and Agricultural Economics

Context/Behavior	TPB variables (and extensions)	Main findings (abridged)
Cross-domain meta-analysis	Attitude, SN, PBC ⟶ Intention/Behavior	Benchmark: 40–50% variance in intentions; 25–35% in behavior (Armitage & Conner, 2001).
Review/extension	Moral norm, self-identity	Extensions often raise predictive power (Conner & Armitage, 1998).
Precision agriculture adoption	Attitude, PBC; implementation intentions	PBC is a strong predictor (Carli, Xhakollari, and Tagliaventi, 2017).
Conservation tillage	Attitude, SN, PBC; moral norm; habit	Moral norm and anticipated guilt can significantly increase explained variance for intentions (Avemegah, et. al. 2024); habit-dampened behavior without plans (Yoder, 2025)
Organic conversion	Attitude, PBC; identity	A deep shift in professional identity is an important

		factor in the decision to convert to organic farming (Xu, et. al., 2018)
Solar pumps/biogas adoption	PBC; descriptive norms	Perceived behavioral control and neighbors' adoptions are strong predictors of adoption (Yashodha, Sanjay, and Mukherji, 2021)
Cooperative membership	SN (leaders/peers), identity, PBC	Injunctive norms and identity as a "community farmer" are key drivers of intentions.
Contract farming	Attitude, PBC; moral norm	Price-stability attitudes and moral norms predict participation (Xu, et. al., 2022).
Global G.A.P. certification	Attitude, PBC; implementation intentions	The complexity and significant investments required for implementing the standard make it accessible to large-scale farms (Seaman and Eves, 2008).
Eco-label purchasing	Attitude, PBC; moral norm, identity	Moral norms and identity can enhance the predictive power of the TPB for this behavior (Yuriev, et. al. 2020)

Animal-welfare products	Affective attitude; anticipated emotions	Emotional factors like anticipated guilt and pride play a role in influencing intentions toward animal-welfare choices (Godin and Kok, 1996)
Local food purchase	Descriptive vs. injunctive norms	Descriptive norms often outweigh injunctive norms in the context of local food purchases (Koroulis, 2016).

4.5 Quantitative Summary of Core TPB Relationships

To complement the narrative synthesis, quantitative evidence from key meta-analyses [7] and agri-food applications was integrated. Across behavioral domains, the TPB model explains on average 40–50 % of variance in intentions and 25–35 % of variance in behaviors, consistent with findings in the broader behavioral literature [25]

Table 2. Average Effect Sizes of Core TPB Predictors

Predictor Relationship	Average β (Standardized)	95 % CI Range	Typical Adjusted R^2 Domain	Key Sources
Attitude $\longrightarrow$ Intention	0.45	0.38–0.52	0.40–0.55 (Intention)	Armitage & Conner (2001); McEachan et al. (2011)
Subjective Norm $\longrightarrow$ Intention	0.25	0.18–0.31	0.40–0.50 (Intention)	Armitage & Conner (2001)
Perceived Behavioral Control $\longrightarrow$ Intention	0.4	0.33–0.47	0.45–0.55 (Intention)	McEachan et al. (2011)
Intention $\longrightarrow$ Behavior	0.35	0.28–0.42	0.25–0.35 (Behavior)	Armitage & Conner (2001); Faries (2016)

These values confirm that Attitude and Perceived Behavioral Control are generally the strongest antecedents of intention, while Subjective Norm remains comparatively weaker and context sensitive. Incorporating moral norms, self-identity, and habit typically increases the model's explanatory power by 7–12 % (ΔR²), as reported in recent agricultural studies [8]

5. Limitations of TPB in Agricultural Contexts

Despite its widespread use and empirical support, the TPB is not without its limitations. A critical review of the literature reveals several enduring critiques that challenge the model's comprehensive ability to explain the full complexity of human behavior [28]

5.1 The intention–behavior gap under resource and risk constraints

The persistent gap between strong intentions and realized behavior is magnified in agriculture by liquidity cycles, input bottlenecks, and production risk. Even when farmers intend to adopt innovations, cashflow timing (pre-season), input stockouts, labor peaks, and weather shocks can prevent execution [27] TPB's PBC partially captures this but may over-rely on perceived control rather than actual control [33] Actual constraints can be measured using objective data such as rainfall, input availability, or credit access [14] Field designs that combine TPB surveys with administrative/market data (credit, input availability, rainfall) can calibrate the PBC–behavior link more accurately. For instance, studies show that providing financial grants or insurance can alleviate financial and weather-related risk constraints, thereby increasing investment decisions that were previously hindered [32]

5.2 Overlooking non-volitional processes: habit, affect, and heuristics

TPB's rational emphasis underplays habit (intergenerational practices), affect (anticipated regret, pride), and heuristics used under uncertainty. Conservation behaviors may be habitual (e.g., conventional tillage) and resistant to change absent a disruption and explicit planning [20] In consumer markets, weekly grocery routines constrain opportunity for deliberation; implementation intentions and choice architecture can help convert intentions into action [31]

5.3 The mixed performance of subjective norms

Agricultural studies frequently report weak or inconsistent subjective norms—a well-known TPB pattern [7] However, this often reflects measurement aggregation. Disaggregating injunctive (approval) and descriptive (what others do) norms and identity ("good farmer," "green consumer") reveals stronger and more interpretable effects [10] In tight cooperative and contract farming networks, norms can be potent; in more individualized settings, they attenuate.

5.4 Time, seasonality, and multi-actor decision units

TPB is commonly implemented with single-timepoint surveys, whereas agricultural choices span seasonal calendars and multi-actor households. Without timing alignment (e.g., measuring intentions well before procurement windows), even strong intentions cannot materialize. Likewise, ignoring spousal or elder influence can misstate subjective norms and locus of control [36]

5.5 Geographic Biases and Generalizability

Systematic reviews of agricultural research reveal significant geographic biases, with a disproportionate number of studies conducted in the Global North. For example, some systematic reviews found that as many as 74% of first authors were affiliated with institutions in North America and Europe, with over half of the studies focusing on North American and European sites [15] Another review of climate-smart agriculture found Germany, Italy, and Iran to be the most common study locations, highlighting a concentration of research in developed nations [26] This geographic imbalance raises questions about the generalizability of findings to different cultural and economic contexts, particularly to the Global South [15] The TPB has also been applied to agribusiness firms and supply chain behavior, suggesting its generalizability beyond individual farmer decisions [35]

6. Extensions and Theoretical Enhancements

The research community has responded to the TPB's limitations not by abandoning the theory but by building upon its solid foundation. The widespread use

of the extended TPB, which integrates additional variables, demonstrates a collective effort to create more comprehensive and context-sensitive models.

6.1 Moral norms and environmental stewardship

In sustainability contexts, moral norms—personal obligations to act in line with ecological or animal-welfare values—substantially enhance prediction [11] For farmers, stewardship norms rooted in community and intergenerational responsibility can elevate intentions to adopt conservation practices even when short-run profits are ambiguous [39] The inclusion of moral norms has been shown to improve the predictive power of a TPB model, for example, increasing the explained variance in farmers' intentions from 58% to 66% in one study on nitrogen fertilizer reduction [13]

6.2 Self-identity and social identity

Self-identity (seeing oneself as a "progressive/innovative farmer" or "steward of the land") frequently strengthens intentions and can moderate attitude–intention links. In consumer markets, a "green consumer" identity drives eco-labeled purchases even under price premiums. Identity constructs often outperform global subjective norms, especially when group prototypes are salient.

6.3 Habit and past behavior

Including habit or past behavior captures automaticity and inertia. In agriculture, routines tied to machinery, labor patterns, or long-standing supplier relationships anchor behavior. Accounting for habit often reduces the apparent effect of intention on behavior but improves overall predictive accuracy and intervention design (e.g., targeting habit disruption points) [40]

6.4 Anticipated emotions and desire

Anticipated regret/pride and desire add affective depth to TPB. For animal-welfare and local food choices, affective attitudes and anticipated emotions mediate belief–intention pathways [10] For farmers, anticipated pride from stewardship and anticipated regret from soil degradation can be salient levers. Studies have shown that the addition of desire can fully mediate the relationship between cognitive attitude and intention and partially mediate other relationships, such as with affective attitude and moral norms [22]

6.5 Implementation intentions and action planning

Implementation intentions—if–then action plans—consistently help close the intention–behavior gap by automating cue-response linkages [20] In agriculture, prompts such as "If I purchase seed on [date], then I will also enroll in the [training] session" or "If rainfall exceeds X mm, then I will apply erosion barriers within 48 hours" can materially raise follow-through. Programs combining TPB-aligned messaging with planning prompts deserve priority evaluation.

Beyond forming intentions, bridging the intention–behavior gap requires procedural strategies. Implementation intentions 'if-then' plans [19] Translate general intentions into context-triggered actions, while habit formation [38] Automates repeated behaviors. Integrating both mechanisms into TPB-based interventions has shown measurable behavioral improvements.

6.6 Decomposition of TPB constructs

Splitting attitude (affective vs. cognitive) and norms (injunctive vs. descriptive) and separating internal vs. external control enhances interpretability [10] In consumer work, injunctive norms (family approval) sometimes trail descriptive norms (peers' actual purchases). In farm adoption, cognitive attitudes (profitability) dominate affective attitudes unless identity and stewardship are salient.
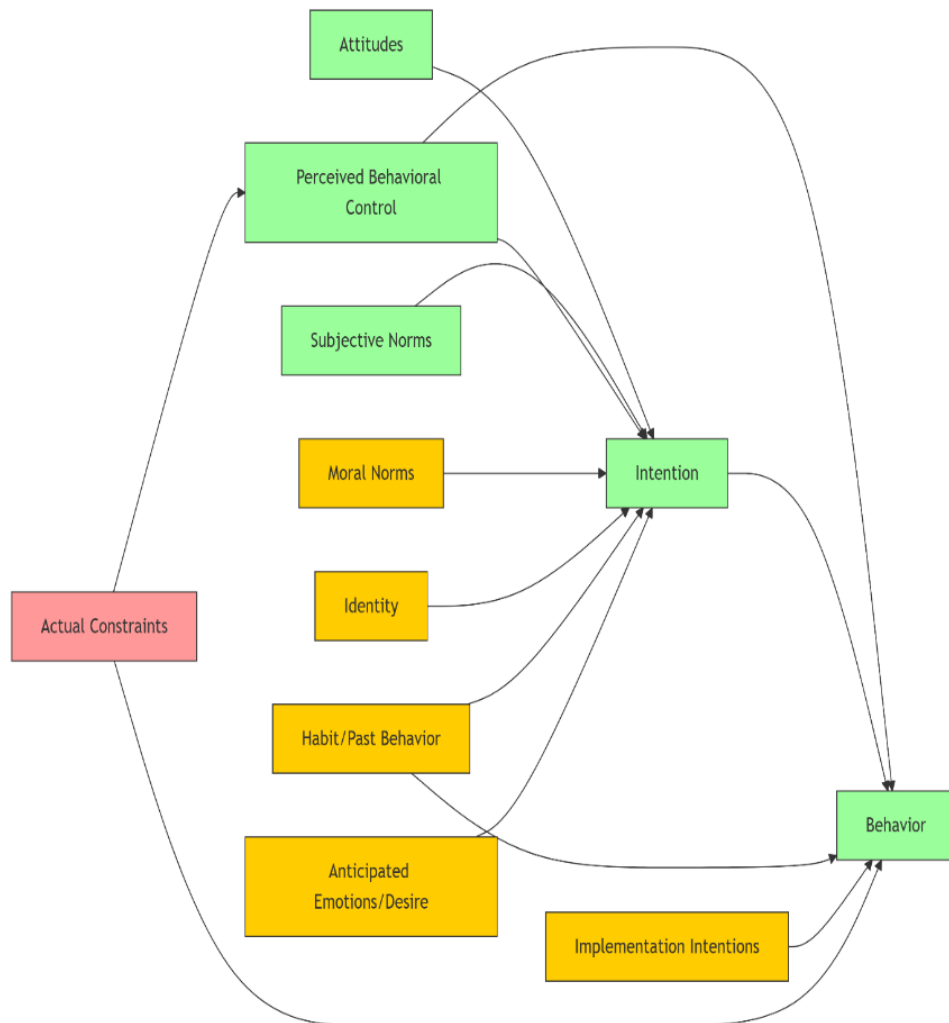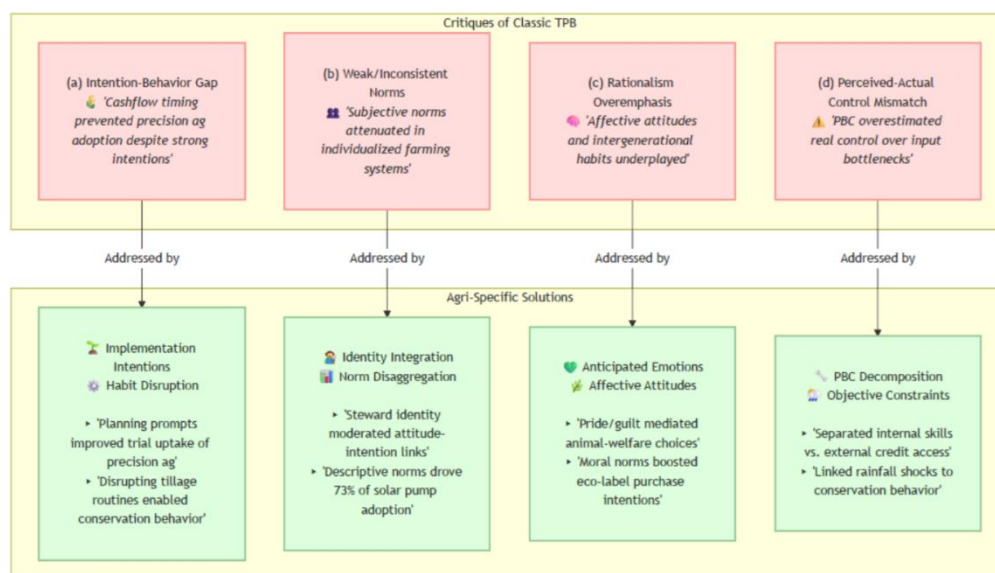
Figure 3. Extended TPB

Figure 4. Mapping Critiques to Extensions in Agriculture

6.7 Summary of Modern TPB Extensions

While the core TPB variables, i.e, Attitude, Subjective Norm, and Perceived Behavioral Control, remain foundational, empirical refinements over the past two decades have incorporated additional constructs that substantially enhance explanatory power and contextual sensitivity. Table 3 summarizes the most widely supported extensions, their theoretical rationale, and quantitative contribution (ΔR^2) as observed across behavioral domains.

Table 3. Summary of Major TPB Extensions

Extension Variable	Theoretical Rationale for Inclusion	Typical Incremental Variance Explained (ΔR^2)	Illustrative Findings & Key References
Moral Norms	Captures internalized moral obligations or ethical duties that transcend social pressure; especially salient in pro-environmental and stewardship behaviors.	+6 – 10 % in Intention	In fertilizer-reduction and conservation contexts, moral norms raised intention R^2 from 58 % to 66 % (Damalas, 2021); Conner & Armitage (1998).
Self-Identity / Social Identity	Reflects self-perception as a "good farmer," "green consumer," or "community member"; moderates Attitude $\longrightarrow$ Intention link.	+5 – 8 % in Intention	Xu et al. (2018) found identity amplified adoption intentions among organic farmers.
Habit / Past Behavior	Represents automatic, repeated behavioral patterns; it explains non-volitional inertia beyond deliberate intention.	+10 – 12 % in Behavior	Yuriev et al. (2020) reported a +10.5 % ΔR^2 in behavior prediction when habit was included.
Anticipated Emotions (Regret, Pride)	Introduces affective and motivational depth; emotions act as proximal drivers of planned actions.	+4 – 7 % in Intention	Affective attitudes predicted animal-welfare purchasing (Godin & Kok, 1996).
Desire	Mediates between attitudes/norms and	+5 – 9 % in Intention	Desire partially mediated Attitude $\longrightarrow$

	intentions, capturing motivational energy to act.		Intention in knowledge-sharing studies (Huang & Chen, 2015).
Implementation Intentions	Translates abstract goals into concrete "if–then" action plans that automate follow-through.	+8 – 15 % in Behavior	Gollwitzer (1999); Ajzen et al. (2009) found intention and behavior correlation increased by about 0.10 when action plans were specified.
Decomposed Constructs (Affective/Cognitive Attitude; Injunctive/Descriptive Norms)	Improves construct precision; reveals context-specific mechanisms behind each belief component.	(improves interpretability rather than ΔR^2)	Conner & Armitage (1998); Fishbein & Ajzen (2010).

Across agribusiness applications, extended TPB models incorporating moral norms, self-identity, habit, and implementation intentions consistently outperform the original framework, with cumulative explanatory gains of 10–20 % in behavioral prediction. These enhancements also align the TPB with contemporary behavioral-economics concepts such as automaticity, emotional salience, and identity-based motivation.

These extensions demonstrate that the TPB's flexibility enables continuous theoretical evolution. Incorporating moral and affective dimensions enhances its normative realism, while identity, habit, and planning variables provide practical leverage points for behavioral interventions. Consequently, the extended TPB offers a more comprehensive account of both deliberate and automatic processes shaping agricultural and food-related behavior.

7. Integration with Economic Models and Policy Design

TPB's psychological levers complement economic incentives and constraints. We highlight three integration pathways.

Risk and liquidity. Embed TPB in models featuring downside risk and seasonal liquidity. PBC can be decomposed and linked to exogenous shocks (rainfall) and financial frictions (credit access) [14] Structural or reduced-form hybrids can quantify how changes in actual control (e.g., a credit line) alter perceived control and intention/behavior. For instance, the provision of rainfall insurance can increase farmers' investment in higher-return, higher-risk crops [14]

Program evaluation. Randomized or quasi-experimental designs can test TPB-informed behavioral nudges (identity-affirming messaging, moral norm appeals) and planning tools (implementation-intention prompts, checklists) layered on subsidies or extension. For example, India has implemented large-scale subsidy schemes for solar water pumps, and TPB models can be used to evaluate how psychological factors like PBC, and social norms interact with these subsidies to influence adoption [39] Outcome measures should include both process metrics (plans formed) and behaviors (adoption, persistence).

Market design and supply chains. Buyer standards and certification can operate via descriptive norms and identity (e.g., "progressive supplier" status). Labelling and choice architecture can support consumers' intention enactment at the point of purchase (e.g., shelf placement enabling PBC).

8. Conclusion and Future Research Directions

8.1 Summary of Findings

This review shows that TPB provides a robust, adaptable framework for explaining agribusiness and agricultural economic behavior. Its core triad, i.e., attitude, subjective norms, and perceived behavioral control, reliably predicts intentions, and to a lesser extent behavior, across production, organizational, and consumption decisions. In agriculture's risk-laden and resource-constrained environments, PBC is particularly salient. Still, the intention and behavior gap remain a central challenge.

The most promising extensions in agrarian contexts include moral norms, self-identity, habit/past behavior, anticipated emotions, and implementation intentions. These enrich TPB's predictive power and offer practical levers for policy and program design.

8.2 Recommendations for Future Research

Based on the findings of this systematic review, several key directions for future research are apparent. Future research should continue to explore the synergistic effects of integrating the TPB with other theoretical frameworks, such as the Norm Activation Model, to develop more holistic models of behavior. Besides that, further studies are needed to understand the mechanisms by which non-volitional factors like emotions, habit, and unconscious processes influence behavior, and how these can be formally incorporated into the TPB framework. This would help to move the model beyond its "rational" focus. Furthermore, future research should address the geographic bias of current literature by conducting targeted initiatives to support research in the Global South [15]. Finally, the application of implementation intentions to a broader range of complex and habitual behaviors, as a practical solution to the intention-behavior gap, remains a fertile area for continued investigation.

8.3 Summary of TPB Critiques and Corresponding Extensions

Table 4 TPB Critiques and Corresponding Extensions

Critique	Description	Proposed Extension/Solution
The Intention-Behavior Gap	A strong intention does not always lead to a corresponding action due to unaddressed situational and psychological barriers. Meta-analytic data suggest intention predicts as little as 30-40% of the variance in health behaviors (Faries, 2016).	Implementation Intentions (explicit "if-then" plans) to automate behavior and bridge the gap (Ajzen, Czasch & Flood, 2009). Adding habit or past behavior as a direct predictor can improve predictive power by 10.5%

		for behavior (Yuriev, et. al., 2020)
Overlooking Non-Volitional Factors	The model is overly rational and fails to account for behaviors driven by emotions, impulses, or unconscious processes.	Integrating constructs like anticipated emotions and desire into the model, affective attitude and moral norms can be used as predictors of desire, which in turn predicts intention (Huang & Chen, 2015).
The Weakness of Subjective Norms	Subjective norms are frequently the weakest predictor of intention, suggesting that personal beliefs and convictions can overshadow social pressure.[17]	Adding more nuanced social constructs, such as moral norms, self-identity, or group identity. These can become such powerful predictors that they diminish the significance of original TPB factors (Yoder, 2025).

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