

Farming and the mind: Automatic, social, and mental models in agriculture

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Farming is often viewed as a technical activity governed by soil, seeds, and weather, yet at its heart, it is shaped by the thoughts, feelings, and social lives of farmers. How farmers think is often automatically influenced by their community, and through deeply ingrained mental models that determines their choices and actions. This article explores the fascinating world of farmers' minds, revealing how habits, social connections, and mental frameworks shape agricultural practices. Understanding these patterns can transform how we support farming communities, leading to more effective and sustainable agricultural development.

Keywords: Agricultural development, Human activity, Social connections

WHEN we think about farming, our minds often jump to tractors, fertilisers, or irrigation. But farming is a human activity deeply influenced by how farmers perceive the world around them. Why do some farmers readily adopt new methods while others stick to traditional practices. The answer lies not just in economics or science but in human behaviour of how farmers automatically think, how they interact socially, and how their mental maps of farming shape their decisions.

Behavioural science, which studies the psychology behind human choices, helps us understand this hidden side of agriculture. By looking inside the farmer's mind, we gain insight into the roots of resistance, innovation, and tradition on the farm.

Understanding farmers thinking and decision-making ability

Farmers' decisions don't happen in a vacuum. They're shaped by many mental processes and social influences. To understand how farmers decide what to do, we can focus on three important ways:

Automatic thinking and habits: These are actions farmers do without

much thought because they've done them for years.

Social influence: Farming is a community activity, and neighbours, family and leaders influence farmers' choices.

Mental models: These are farmers' personal beliefs and ideas about how farming works, based on experience and culture.

Invisible force of habits and automatic thinking

Farmers' daily routines are filled with habits - practices repeated so often they become automatic. These habits make life manageable, freeing mental energy for other tasks, but they also create resistance to change. Take the example of flood irrigation, still widely used despite more efficient methods like drip irrigation. Many farmers flood their fields because the practice fits their daily schedule, tools, and community norms. It's a practice passed down through generations, so automatically it feels natural.

These automatic behaviours act like mental shortcuts. Instead of analysing every step, farmers rely on experience and learned routines. While this can speed up decision-making, it can also blindside farmers

to opt better options, especially if changing a habit feels risky or complicated.

Farming as a social activity: The power of community

Farming decisions are deeply social. When a respected farmer in a village tries a new seed variety and sees success, others often follow and shape their choices. This social contagion spreads innovations, much like a popular trend. In India's Green Revolution, early adopters became local heroes, and their success stories inspired neighbours to switch to high-yielding seed varieties. But social influence isn't always positive. Traditions and norms can also maintain outdated practices. For example, crop residue burning remains common in parts of Punjab and Haryana despite severe air pollution, largely because it is a quick, community-accepted method of clearing fields.

Social norms shape what is considered 'right' or 'normal'. When entire village believes certain practices are part of their identity, change becomes a collective challenge. Farmers care deeply about their reputation and standing and may avoid practices that risk

Case study 1:

Farmers practicing precision agriculture in Dharmapuri District, Tamil Nadu

Mr. R. Velappan, aged 55 years, who studied up to middle school, is a full time farmer, with 38 years of farming experience with a total land holding of 6.80 acres located in Semmanahalli village, Dharmapuri district, Tamil Nadu. His wife and two sons have also been actively involved in farming since 2008. He installed a drip irrigation system on 2 ha of land with a subsidy of ₹2,50,000 (75% subsidy), and uses bio-fertilisers and vermicompost on his farm. He cultivates papaya and guava on 2 acres each, with annual sales ranging from ₹7,00,000–10,00,000. Mr. Velappan received training in precision farming from KVK and TNAU. He believed that reducing the use of fertilisers would lower the cost of cultivation while increasing yield and income. He considered this to be his great success. It was also noteworthy that he was well aware of the degradation of soil fertility and environment quality caused by the excessive use of chemical fertilisers and pesticides.

The case study of Mr. R. Velappan primarily reflects the mental model approach. The following analysis illustrates how these decision-making approaches are reflected in his farming practices.

Mental model: Mr. Velappan's decisions reflect a well-developed understanding of sustainable farming, environmental conservation, and efficient resource management. His training through KVK and TNAU strengthened his ability to make informed farming decisions.

Automatic model: His long farming experience helped develop practical habits and quick decision-making skills, particularly in adopting precision irrigation and utilising government support schemes.

Social model: Family participation and training through KVK and TNAU provided social support that encouraged the adoption of precision farming practices.

social disapproval. Trust also plays a critical role. Farmers often trust advice from neighbours, family, or familiar extension workers more than information from official sources.

Mental models: How farmers understand their world

Every farmer carries a mental model i.e. a personal framework of how farming works, built from years of experience, observation, and cultural influences. These mental models guide how farmers interpret weather, pests, soil health, and market conditions. For example, many farmers believe that simply adding more fertiliser will always increase yield. This mental model overlooks complexities like nutrient balance or soil health, and can lead to overuse of chemicals. Sometimes, mental models reflect a deep connection to the land and tradition. In Sikkim, the mental model of 'farming as harmony with nature' helped transform the state into India's first fully organic state. Farmers embraced organic practices not just for yields, but as part of their identity and respect for the environment.

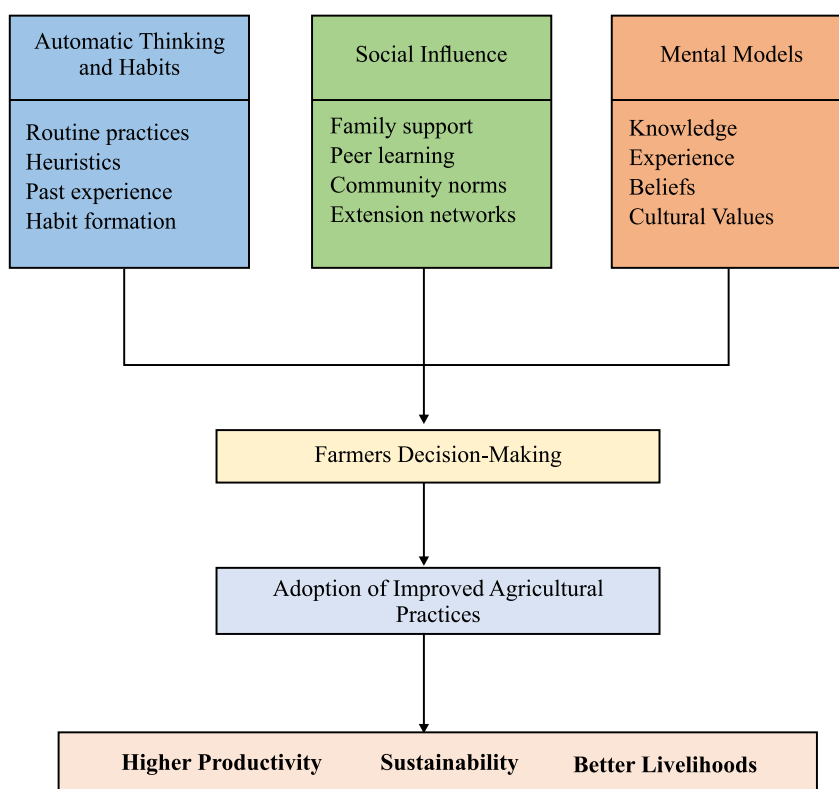
Changing mental models is not easy. It requires new experiences, observations, and often a shift in how farmers see themselves

and their role in the ecosystem. Visual tools, stories, and hands-on demonstrations can help farmers see alternative ways of farming can work.

Role of agricultural extension in applying behavioural insights

Understanding farmers' automatic thinking, social influences,

and mental models is essential for effective agricultural extension. Extension professionals act as a vital link between scientific research and the practical realities faced by farmers. By integrating behavioural insights into their work, extension services can move beyond simply transferring technical knowledge to designing interventions that align



Conceptual illustration showing the influence of behavioural factors on farmers decision-making and the adoption of improved agricultural practices

Case study 2:

Andhra Pradesh community managed natural farming

The Andhra Pradesh Community Managed Natural Farming (APCNF) programme demonstrates how behavioural factors can drive the adoption of sustainable agricultural practices. The programme promotes natural farming through farmer-to-farmer learning, demonstration plots, community resource persons, and regular village meetings. The programme also supports a shift in farmers' mental models by demonstrating that sustainable crop production can be achieved with reduced dependence on synthetic fertilisers and pesticides. Continuous interaction with community resource persons and repeated exposure to successful field demonstrations reinforce new farming habits, making natural farming practices a routine part of agricultural operations.

This case illustrates that agricultural transformation is not driven by technology alone but also by trust, social influence, experiential learning, and changes in farmers' perceptions, emphasising the importance of behaviourally informed extension approaches.

Mental model: Farmers gradually shifted from the belief that high chemical inputs are essential for productivity to recognising the benefits of natural farming.

Social influence: Farmer-to-farmer learning, community resource persons, and successful neighbouring farmers encouraged wider adoption of natural farming practices.

Automatic thinking: Regular practice and continuous guidance helped farmers develop new habits, making natural farming an integral part of their farming routine.

more sustainable.

Such a behavioural approach recognises that farmers' decisions are influenced by their social environment, experiences, and cultural values. By considering these factors, agricultural extension can strengthen farmer engagement, build trust, and encourage the adoption of innovative and sustainable farming practices. This behaviourally informed approach can enhance the effectiveness of agricultural extension and contribute to sustainable agricultural development.

SUMMARY

Farmers' decisions are deeply influenced by automatic habits, social dynamics, and personal mental models shaped by years of experience and culture. Recognising and working with these behavioural factors enables agricultural extension to move beyond simply sharing information and instead foster meaningful and lasting change. By integrating behavioural insights, extension services can design interventions that resonate with farmers' realities, build trust, and encourage the adoption of innovative and sustainable practices. This shift toward a behaviourally informed approach promises a more effective and empathetic pathway to agricultural development and food security.

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with farmers' existing beliefs, habits, and social environments.

For instance, extension agents can use demonstrations, farmer field schools, and participatory workshops to provide practical learning experiences that encourage farmers to adopt improved agricultural practices. Observing successful demonstrations on local farms increases farmers' confidence and promotes technology adoption. Extension professionals can also involve respected community leaders, progressive farmers, and peer groups in extension activities.

Their participation builds farmers' confidence and encourages wider adoption of improved technologies.

Addressing habitual behaviour is equally important. Farmers often have deeply ingrained routines that provide comfort and predictability. Extension agents can support change by introducing small, manageable steps or gradual nudges, such as pilot plots, small incentives, or easy-to-follow instructions that make new practices less overwhelming and more accessible. This reduces perceived risk and cognitive load, making transitions smoother and

National Pest Surveillance System

Launched on 15th August 2024 to enhance the surveillance and management of pest diseases across the country. The system utilises latest digital technologies such as Artificial Intelligence and Machine Learning (AI and ML) to provide quick and instant solution regarding pest attacks, crop diseases, crop damages, etc. by issuing real time crop protection advisory to the farmers. It includes a user-friendly mobile app and a portal for identification of pests and disease mitigation through integrated pest management.

