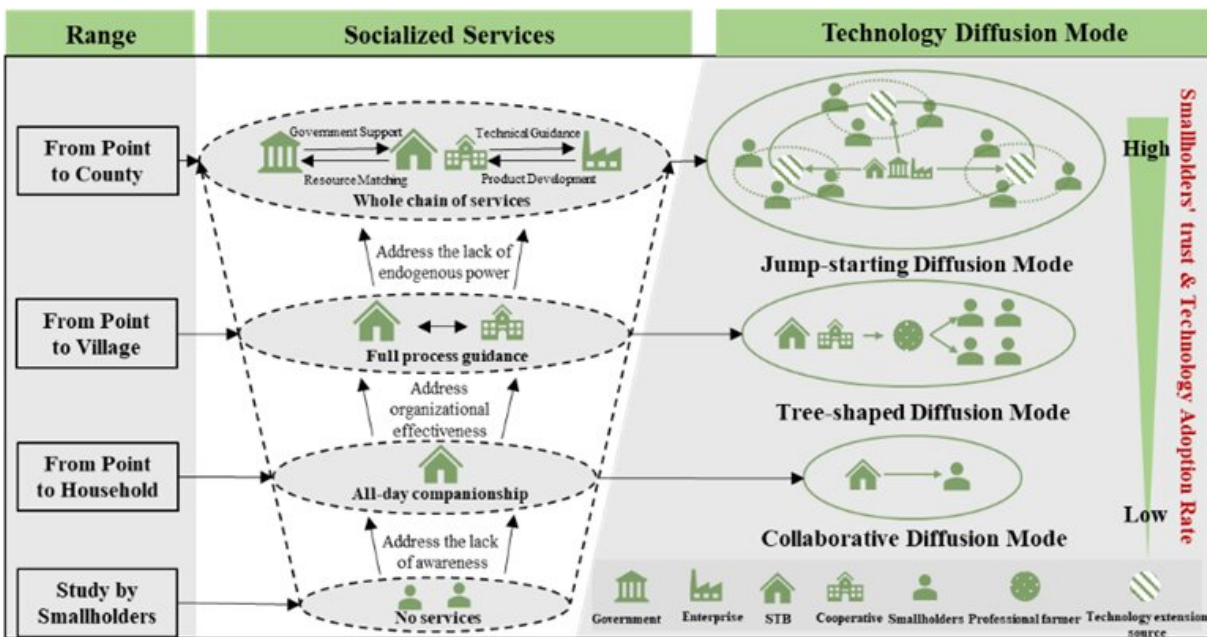


Smallholder adoption of green production technologies on the North China Plain

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STB: Science and Technology Backyard

Credit: Yajuan Li , Qianni Huang

As the important participants and decisionmakers in agricultural production, smallholders play a crucial role in food production. Smallholders' low level of technology awareness and capacity leads to problems such as the insufficient technology adoption. Coupled with their poor risk tolerance and lack of trust in new technologies, this makes them lack the motivation to actively adopt green production

technologies, which seriously hinders the green transformation of agriculture. What should be done to promote smallholders' adoption of green production technologies proactively? The existence of multiple socialized services and agricultural technology diffusion systems offers a possible solution.

Existing production agriculture extension is divided into two distinct approaches: top-down and bottom-up modes. The former starts with scientists creating innovative technologies in the laboratory and introducing them to smallholders through organizations such as agricultural technology extension service centers (ATESC). This mode ignores smallholders' motivation, and trust issues arising from the uneven quality of services becomes a crucial barrier to [technology diffusion](#).

The latter mode is mainly based on smallholders' production technologies demand and socialized services, through [participatory technological innovation](#), resulting in localized technologies and diffusion. However, because this approach requires scientists and smallholders to learn together, it is less controllable and runs the risk of being a formality. We believe that an intimate partnership with smallholders is needed, while empowering them through zero-distance socialized services and stimulating their willingness to actively adopt green production technologies to form a long-term mechanism for sustainable green production.

A good example of this is the Science and Technology Backyard (STB) founded by the team of Prof. Fusuo Zhang of China Agricultural University. The teachers and graduate students of the STB are permanently rooted in the front line of rural production, forming a typical bottom-up approach to technological innovation through continuous interaction, learning and co-innovation with smallholders. This mode solves the problem of adaptive technological innovation and

effectively promotes the application of green production technologies at different scales, but how to gradually realize the diffusion of technological innovation from the pilot areas to the regional level is still unclear.

Therefore, the authors take the Wangzhuang STB in Quzhou, Hebei, China, as the research object, and explore how STB empowers smallholders through participatory technology innovation and builds their continuous trust through a socialized services mode with multi-entity participation, and promotes the technology of participatory innovation in a collaborative, tree-shaped and jump-start diffusion mode to promote the diffusion of participatory technology innovation in different scales, such as farmers, villages and counties. This kind of technology diffusion based on STB empowers smallholders through zero-distance socialized services and effectively solves the problem from technology [innovation](#) to technology diffusion in the region, which is a highly applicable and practical [technology innovation](#) and diffusion mode and an effective way to promote the sustainable adoption of green production technologies by smallholders.

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