Appendix 1. List of articles included in SLR and their main findings (n=51)

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| **Source** | **Year** | **Country** | **Method** | **Sample** | **Findings** |
| Abi et al. | 2019 | Ethiopia | A controlled experimental design | 52 farmers | * Farmers’ awareness to reduce drought can be elevated through an adapted training for mass-mobilization approach.
* Farmers who followed the training were better at mitigating future drought and more aware of the possible impacts of drought on farmland.
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| Alaudin et al. | 2020 | Bangladesh | Surveys | 108 farmers | * Alternate wetting and drying (AWD) irrigation can save water resources and irrigation costs, while increasing crop yield.
* Farmers’ adoption of AWD was affected by the age and education level of the household head, access to weather information, land ownership, typography, and soil type.
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| Barbier et al. | 2009 | Burkina Faso | FGDs and surveys | Surveys with 105 (in 2004) + 100 (in 2006) farmers | * Farmers have adopted several techniques to increase yield and reduce its variability.
* Growing land scarcity and new market opportunities are why farmers adopt those practices instead of climate variability issues.
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| Bhalerao et al. | 2022 | India | Interviews | >800 farmers | * Despite declining water availability and soil fertility, affected farmers have adopted some low-cost measures to sustain their livelihood.
* High production costs and low awareness of efficient technologies are the major barriers to the adaptation by tribal farmers.
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| Bosma et al. | 2012 | Vietnam | Surveys | 94 farmers | * Rice-fish (RF) farming system will provide farmers with a higher farm income and productivity.
* Higher input costs are needed compared to conventional farming systems.
* Farmers with better access to financial support are more likely to adopt RF system.
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| Branca et al. | 2021 | Malawi and Zambia | Surveys | 505 (Malawi) and 695 (Zambia) households | * Farmers will receive significant economic returns when they switch their conventional practices to climate-smart ones.
* The challenge is the high up-front cost of applying a suitable technology.
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| Branca et al. | 2022 | Ethiopia, Malawi, South Africa, and Tanzania | Surveys, interviews, FGDs, and multi-actor platform meetings | 2208 farmers (surveys) | * Farmers with better financial and food-secure status are more likely to adopt agricultural technology innovations.
* Technology packages need to consider the complexity and diversity of the smallholder farming systems.
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| Bryan et al. | 2009 | South Africa and Ethiopia | Surveys | 800 (South Africa) and 1000 (Ethiopia) households | * Improved agricultural technologies, water storage facilities, irrigation, and crop varieties may positively affect CC adaptation at the farm level.
* Farmers’ access to extension services and financial support is essential.
* CC adaptation issues should be addressed based on the specific socioeconomic conditions of a region.
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| Byrareddy et al. | 2021 | Vietnam | Surveys and archival research | 558 coffee farmers (surveys) | * Farmers who implement a combination of mulching and irrigation practices experienced a better adaptation to CC than those adopting only the irrigation system.
* However, farmers with more experience have a “no-risk” attitude to drought season, affecting their adoption of mulching practices.
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| Das et al. | 2022 | India | Interviews | 200 farmers | * Farmers prefer to adapt climate-smart agriculture through indigenous technical knowledge.
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| de Lauwere et al. | 2022 | Netherlands | In-depth interviews and surveys | 13 participants (in-depth interviews) and 429 farmers (surveys) | * Higher measures towards circular agriculture (CA) result in farmers’ motivation towards social and environmental values instead of only economic values.
* Knowledge, environmental resistance, and legislative issues limit farmers’ transition towards CA.
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| Foguesatto et al. | 2019 | Brazil | Surveys | 172 farmers | * The eco-centric farmers’ pro-environmental behavior is affected by their sense of environmental and cultural aspects.
* Financial incentives to adopt SAPs may attract farmers who use economic value as their drivers for a pro-environmental behavior.
* The Low Carbon Agriculture Plan can be a solution for both types of farmers.
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| Gutschow et al. | 2021 | Germany | Online surveys and hybrid interviews | 51 respondents (online surveys) and 10 participants for online-offline interviews  | * Farmers’ action space can explain their engagement with SAPs.
* The implementation of diversified crop rotations as climate mitigation strategy is not economically viable.
* Most environmental-friendly practices are not perceived as a ‘business-viable’ strategy as they limit revenue margins and threaten the agribusiness's survival level.
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| Hidayat et al. | 2020 | Indonesia | In-depth interviews, field observations, and secondary data | 10 informants (in-depth interviews) and 64 households (field observations) | * Farmers’ Low External Input and Sustainable Agriculture (LEISA) and organic farming practices have been turned into High-External Input Agriculture (HEIA) after the green revolution program in Indonesia.
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| Iqbal et al. | 2020 | Pakistan | Surveys | 480 farmers | * Agriculture policy influences farmers’ risk toward their farm activities.
* Farmers with weak socio-economic status struggled to access information on prices and markets.
* Small DAMs can be a priority for risk management strategy.
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| Jabbar et al. | 2022 | Pakistan | Surveys | 440 farmers | * Farmers participating in farmer field school (FFS) have better adoption of SAPs than those who do not participate.
* ICT usage, land tenure status, and extension service influence farmers’ FFS participation.
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| Kiani et al. | 2021 | Pakistan | Surveys | 410 farmers | * Farmers have experienced a significant loss of farm income due to crop diversification practices.
* The agricultural diversification strategy is environmentally-beneficial yet financially unviable and time-cost.
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| Kmoch et al. | 2018 | Morocco | Survey using qualitative interviews | 32 farmers | * Local knowledge approach suits specific area or socio-economic conditions and strengthen local innovation processes for adaptation options.
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| Kopytko  | 2019 | India | Interviews and FGD | 45 farmers (interviews) | * Natural conservation and financial access have motivated farmers to adopt sustainable techniques.
* Farmers believed attracting additional innovators required the development of new markets.
* India’s Protection of Plant Varieties and Farmers’ Rights Act recognize farmers as plant breeders but does not provide an incentive to innovate sustainably.
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| Kristjanson et al. | 2012 | Kenya, Uganda, Tanzania, Ethiopia | Surveys | 700 smallholder households | * Farmers’ adaptation to SAPs could be affected by many drivers, including the CC issue. However, the differences between each driving force were not significant.
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| Liu et al. | 2022 | China | Surveys | 151 farmers | * Farmers’ CC adaptation strategies can be varied depends on the locations.
* Rapid urbanization, low crop farming incomes, and climate warming have affected the invention of sustainable agriculture and rural development.
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| Luu | 2020 | Vietnam | Surveys | 350 farmers | * Educational level, social capital, access to credit, farmland size, farmland tenure status, extension service, and market constraint determine farmers’ adoption of Climate-smart Agriculture (CSA).
* Farmers with large production scales are more financially capable and likely to afford CSA technology.
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| Ma et al. | 2022 | China | Surveys | 848 households | * Farmers’ choice to crop variety depends on the risk of income loss. They prefer low potential yield reduction.
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| Maggio et al. | 2022 | Uganda | Surveys | 3123 households | * Organic fertilizer and maize-legume intercropping can be an effective strategy for improving the value of crop production and resilience towards high-temperature deviations.
* An increase in farmers’ level of adoption of the strategy will increase the overall benefits.
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| Maharjan et al.  | 2022a | Japan | Surveys | 279 farmers | * Some farmers perceived Environmental Conservation Agriculture (ECA) as a strategy to mitigate CC due to the limited use of pesticides or chemical substances.
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| Maharjan et al. | 2022b | Japan | Surveys | 46 farmers | * Direct selling to consumers (farmers-to-consumer market channels) can improve the benefits of implementing ECA, especially for farmers.
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| Makate et al. | 2017 | Zambia, Malawi, and Mozambique | Surveys | 312 farmers | * Farmers’ perceptions to CC may result in using inorganic fertilizers, compost manure, and farmyard manure, as they anticipate poor yields and adverse CC impacts in the future.
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| Maleksaeidi et al. | 2016 | Iran | Surveys | 260 farmers | * Farm households’ resilience to CC can be increased by improving knowledge management.
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| Martinez et al. | 2022 | Brazil | National surveys  | 645 municipalities | * Neighboring farmers’ conditions influence one’s adoption of the diffusion of water-saving (localized) irrigation systems.
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| Masud et al. | 2022 | Malaysia | Surveys | 500 farmers | * Economic, social, natural, and institutional barriers limit farmers' adaptation to climate change.
* Financial accessibility and price stability of all agricultural inputs are needed to improve farmers’ adaptation practices.
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| Mohring et al. | 2022 | Switzerland | Field observation and experiments | 53 farmers | * Farmers will reduce their use of insecticide during the extreme heat period, resulting in lower total costs of crop production.
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| Molua | 2022 | Cameroon | Surveys | 215 farmers | * Market access, farming experience, farm size, land tenure security, access to extension, and practice to agroforestry enhanced farmers’ potential to adapt to climate issues.
* Farm income is highly expected to lose without an adaptation strategy, considering future CC impacts.
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| Musafiri et al. | 2022 | Kenya | Surveys | 300 farmers | * Despite their awareness of CC drivers and effects, smallholders’ capacity to adapt has been limited by unpredictable weather patterns, financial constraints, and lack of agricultural training.
* Farmers’ group has been a negative influence on smallholders’ CC adaptation.
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| Nwobodo et al. | 2022 | Nigeria | Semi-structured interviews | 1. armers
 | * Veterinary services, monthly household income, annual income from ruminant production, and the level of knowledge influence farmers’ implementation of sustainable practices.
* Financial inclusion schemes can improve farmers’ adaptation to sustainable practices.
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| Quan et al. | 2019 | China | Surveys | 314 farmers | * The size of the cultivated area, the level of cognition skills, and the accessibility of information influence farmers’ adaptation decisions.
* Farmers’ limited adaptation strategies to CC result in false practices, such as excessive irrigation and chemical application, and negatively affect wheat yields
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| Rakotovao et al. | 2021 | Madagascar | Surveys based on scenarios for agroecological practices (AP) | 192 farmers | * AP can potentially to increase smallholder farmers’ productivity and profitability in the long run while mitigating CC.
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| Roesch-McNally et al. | 2020 | The United States (U.S.) | Online surveys | 123 small-scale farmers | * Small-scale farmers were concerned about CC and agreed to change practices to cope with CC uncertainties for a long-term farming benefit. However, they have limited knowledge and skills to deal with the issue.
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| Samuel and Sylvia | 2019 | South Africa | Surveys and FGDs | 346 farmers (surveys) | * Awareness of CC, irrigation access, and the extension visit frequency influence farmers’ adaptation strategies.
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| Sarkar et al. | 2022 | Bangladesh | Surveys | 400 farmers | * Necessary resources, and a set of knowledge, skills, and training facilities can improve farmers’ adoption of sustainable agriculture.
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| Schukat and Heise | 2021 | Germany | Online surveys | 523 farmers | * Smart farming provides more resource-efficient, sustainable, and profitable productions.
* Smart products receive a positive perception amongst farmers.
* A ‘hedonic motivation’ influences farmers' behavioral intention to use smart products.
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| Setsoafia et al. | 2022 | Ghana | Surveys using the Computer Assisted Personal Interviewing | 1284 households | * Adopting a set of SAPs (improving seed, fertilizers, and soil and water conservations) can stimulate better impacts than a partial adoption of single or two SAPs.
* Farmers’ decision to adopt SAPs has been affected by the household’s socio-demographical aspects, plot-level characteristics, extension services, and locations.
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| Sikandar et al. | 2022 | Pakistan | Surveys | 384 farmers | * Between SAPs and agricultural production, foreign aid is a moderation factor to link the two successfully.
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| Singh et al. | 2021 | India | Surveys and FGDs | 182 farmers (surveys) and 7-10 participants in each FGD | * The flood recession farming can upscale community livelihood and food security and improve environmental conditions.
* Farmers’ adoption of this strategy was affected by the farmers’ skills and the invention of new technologies.
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| Singh et al. | 2020 | India | Interviews and secondary data | 24 key informants (qualitative interviews) and 60 farmers (quantitative interviews) | * Farmers perceived climate variability as a crucial stressor to the ecological, socio-economic, and political issues.
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| Siulemba and Moodley  | 2014 | Zambia | Surveys, key informant interviews, and focus group discussions (FGDs) | 70 households (surveys), 10 males and 10 females for key informant interviews and FGDs  | * There is no difference between men and women regarding their practice on managing natural resources.
* Larger families have better engagement on SAPs rather than smaller ones.
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| Sohail and Chen | 2022 | Pakistan | “In-depth interviews”  | 1200 farmers | * There are strong linkages between farmers' knowledge and adaptation strategies, food security, risk assessment, and livelihood assets.
* Farmers are expected to reduce risks as low as possible at any time.
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| Torres et al. | 2020 | Mexico | Surveys  | 370 farmers | * Generally, farmers prefer adaptation rather than mitigation actions due to ‘instant’ benefit once it is adopted.
* Farmers prioritized actions that provide short-run economic benefits.
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| Trivedi and Sunder | 2021 | India | Desktop review and consultative meetings (interviews) | N/A | * Remunerative markets (agritourism, contract farming, and integrated food processing) can help support farmers’ financial sustainability given their crucial role in the agriculture supply chain.
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| Upadhaya et al. | 2020 | India | Surveys, key informant interviews, and FGDs | N/A | * Despite a practicing sustainable system, farmers modified traditional cultivation system to improve food production and meet the growing food demand.
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| Wilk et al. | 2013 | South Africa | Interviews | 44 farmers | * Small-scale farmers were more vulnerable to CC compared to commercial farmers.
* High costs of production inputs, limited access to knowledge, and agricultural techniques affect small-scale farmers' adaptive capacity.
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| Zeweld et al. | 2018 | Ethiopia | Surveys | 350 households | * Farmers’ adoption to land management practices (agroforestry, crop rotation, and compost) have been influenced by their attitudes, access to information, educational level, group membership, social capital, risk attitudes, and labor supply.
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