

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

Source	Year	Country	Method	Sample	Findings
Abi et al.	2019	Ethiopia	A controlled experimental design	52 farmers	<ul style="list-style-type: none"> • 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.
Alaudin et al.	2020	Bangladesh	Surveys	108 farmers	<ul style="list-style-type: none"> • 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.
Barbier et al.	2009	Burkina Faso	FGDs and surveys	Surveys with 105 (in 2004) + 100 (in 2006) farmers	<ul style="list-style-type: none"> • 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.
Bhalerao et al.	2022	India	Interviews	>800 farmers	<ul style="list-style-type: none"> • 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.
Bosma et al.	2012	Vietnam	Surveys	94 farmers	<ul style="list-style-type: none"> • 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.

Branca et al.	2021	Malawi and Zambia	Surveys	505 (Malawi) and 695 (Zambia) households	<ul style="list-style-type: none"> • 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.
Branca et al.	2022	Ethiopia, Malawi, South Africa, and Tanzania	Surveys, interviews, FGDs, and multi-actor platform meetings	2208 farmers (surveys)	<ul style="list-style-type: none"> • 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.
Bryan et al.	2009	South Africa and Ethiopia	Surveys	800 (South Africa) and 1000 (Ethiopia) households	<ul style="list-style-type: none"> • 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.
Byrareddy et al.	2021	Vietnam	Surveys and archival research	558 coffee farmers (surveys)	<ul style="list-style-type: none"> • 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.
Das et al.	2022	India	Interviews	200 farmers	<ul style="list-style-type: none"> • Farmers prefer to adapt climate-smart agriculture through indigenous technical knowledge.
de Lauwere et al.	2022	Netherlands	In-depth interviews and surveys	13 participants (in-depth interviews) and 429 farmers (surveys)	<ul style="list-style-type: none"> • Higher measures towards circular agriculture (CA) result in farmers' motivation towards social and environmental values

					<p>instead of only economic values.</p> <ul style="list-style-type: none"> • Knowledge, environmental resistance, and legislative issues limit farmers' transition towards CA.
Foguesatto et al.	2019	Brazil	Surveys	172 farmers	<ul style="list-style-type: none"> • 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.
Gutschow et al.	2021	Germany	Online surveys and hybrid interviews	51 respondents (online surveys) and 10 participants for online-offline interviews	<ul style="list-style-type: none"> • 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.
Hidayat et al.	2020	Indonesia	In-depth interviews, field observations, and secondary data	10 informants (in-depth interviews) and 64 households (field observations)	<ul style="list-style-type: none"> • 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.
Iqbal et al.	2020	Pakistan	Surveys	480 farmers	<ul style="list-style-type: none"> • 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.

Jabbar et al.	2022	Pakistan	Surveys	440 farmers	<ul style="list-style-type: none"> • 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.
Kiani et al.	2021	Pakistan	Surveys	410 farmers	<ul style="list-style-type: none"> • 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.
Kmoch et al.	2018	Morocco	Survey using qualitative interviews	32 farmers	<ul style="list-style-type: none"> • Local knowledge approach suits specific area or socio-economic conditions and strengthen local innovation processes for adaptation options.
Kopytko	2019	India	Interviews and FGD	45 farmers (interviews)	<ul style="list-style-type: none"> • 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.
Kristjanson et al.	2012	Kenya, Uganda, Tanzania, Ethiopia	Surveys	700 smallholder households	<ul style="list-style-type: none"> • Farmers' adaptation to SAPs could be affected by many drivers, including the CC issue. However, the differences between each driving force were not significant.
Liu et al.	2022	China	Surveys	151 farmers	<ul style="list-style-type: none"> • 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.
Luu	2020	Vietnam	Surveys	350 farmers	<ul style="list-style-type: none"> • Educational level, social capital, access to credit, farmland size, farmland

					<p>tenure status, extension service, and market constraint determine farmers' adoption of Climate-smart Agriculture (CSA).</p> <ul style="list-style-type: none"> • Farmers with large production scales are more financially capable and likely to afford CSA technology.
Ma et al.	2022	China	Surveys	848 households	<ul style="list-style-type: none"> • Farmers' choice to crop variety depends on the risk of income loss. They prefer low potential yield reduction.
Maggio et al.	2022	Uganda	Surveys	3123 households	<ul style="list-style-type: none"> • 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.
Maharjan et al.	2022a	Japan	Surveys	279 farmers	<ul style="list-style-type: none"> • Some farmers perceived Environmental Conservation Agriculture (ECA) as a strategy to mitigate CC due to the limited use of pesticides or chemical substances.
Maharjan et al.	2022b	Japan	Surveys	46 farmers	<ul style="list-style-type: none"> • Direct selling to consumers (farmers-to-consumer market channels) can improve the benefits of implementing ECA, especially for farmers.
Makate et al.	2017	Zambia, Malawi, and Mozambique	Surveys	312 farmers	<ul style="list-style-type: none"> • 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.
Maleksaeidi et al.	2016	Iran	Surveys	260 farmers	<ul style="list-style-type: none"> • Farm households' resilience to CC can be increased by improving knowledge management.
Martinez et al.	2022	Brazil	National surveys	645 municipalities	<ul style="list-style-type: none"> • Neighboring farmers' conditions influence one's adoption of the diffusion

					of water-saving (localized) irrigation systems.
Masud et al.	2022	Malaysia	Surveys	500 farmers	<ul style="list-style-type: none"> • 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.
Mohring et al.	2022	Switzerland	Field observation and experiments	53 farmers	<ul style="list-style-type: none"> • Farmers will reduce their use of insecticide during the extreme heat period, resulting in lower total costs of crop production.
Molua	2022	Cameroon	Surveys	215 farmers	<ul style="list-style-type: none"> • 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.
Musafiri et al.	2022	Kenya	Surveys	300 farmers	<ul style="list-style-type: none"> • 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.
Nwobodo et al.	2022	Nigeria	Semi-structured interviews	96 farmers	<ul style="list-style-type: none"> • 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.
Quan et al.	2019	China	Surveys	314 farmers	<ul style="list-style-type: none"> • The size of the cultivated area, the level of cognition skills, and the accessibility of information influence farmers' adaptation decisions.

					<ul style="list-style-type: none"> • Farmers' limited adaptation strategies to CC result in false practices, such as excessive irrigation and chemical application, and negatively affect wheat yields
Rakotovao et al.	2021	Madagascar	Surveys based on scenarios for agroecological practices (AP)	192 farmers	<ul style="list-style-type: none"> • AP can potentially to increase smallholder farmers' productivity and profitability in the long run while mitigating CC.
Roesch-McNally et al.	2020	The United States (U.S.)	Online surveys	123 small-scale farmers	<ul style="list-style-type: none"> • 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.
Samuel and Sylvia	2019	South Africa	Surveys and FGDs	346 farmers (surveys)	<ul style="list-style-type: none"> • Awareness of CC, irrigation access, and the extension visit frequency influence farmers' adaptation strategies.
Sarkar et al.	2022	Bangladesh	Surveys	400 farmers	<ul style="list-style-type: none"> • Necessary resources, and a set of knowledge, skills, and training facilities can improve farmers' adoption of sustainable agriculture.
Schukat and Heise	2021	Germany	Online surveys	523 farmers	<ul style="list-style-type: none"> • 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.
Setsoafia et al.	2022	Ghana	Surveys using the Computer Assisted Personal Interviewing	1284 households	<ul style="list-style-type: none"> • 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.

Sikandar et al.	2022	Pakistan	Surveys	384 farmers	<ul style="list-style-type: none"> Between SAPs and agricultural production, foreign aid is a moderation factor to link the two successfully.
Singh et al.	2021	India	Surveys and FGDs	182 farmers (surveys) and 7-10 participants in each FGD	<ul style="list-style-type: none"> 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.
Singh et al.	2020	India	Interviews and secondary data	24 key informants (qualitative interviews) and 60 farmers (quantitative interviews)	<ul style="list-style-type: none"> Farmers perceived climate variability as a crucial stressor to the ecological, socio-economic, and political issues.
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	<ul style="list-style-type: none"> 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.
Sohail and Chen	2022	Pakistan	"In-depth interviews"	1200 farmers	<ul style="list-style-type: none"> 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.
Torres et al.	2020	Mexico	Surveys	370 farmers	<ul style="list-style-type: none"> 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.
Trivedi and Sunder	2021	India	Desktop review and consultative meetings (interviews)	N/A	<ul style="list-style-type: none"> Remunerative markets (agritourism, contract farming, and integrated food processing) can help support farmers' financial sustainability given their crucial role in the agriculture supply chain.
Upadhaya et al.	2020	India	Surveys, key informant	N/A	<ul style="list-style-type: none"> Despite a practicing sustainable system, farmers modified

			interviews, and FGDs		traditional cultivation system to improve food production and meet the growing food demand.
Wilk et al.	2013	South Africa	Interviews	44 farmers	<ul style="list-style-type: none"> • 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.
Zeweld et al.	2018	Ethiopia	Surveys	350 households	<ul style="list-style-type: none"> • 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.