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Recent agriculture adaption regarding climate change

Abstract

Future climate change including extreme climate events will tremendously affect agriculture sector. The altered rainfall pattern and rising temperature affect the water sources and land use pattern which in turn affect agricultural productivity. Concerning traditional agricultural farming process adopted by farmers it is time to use well managed and transformed agriculture practices which match with current climatic conditions. In this review we tried to explain agriculture practices at farm level, changes in climatic condition and their causes on agriculture productivity. Keeping global climate in mind new innovative techniques, farmer's training and future research is needed to improve productivity at farm level. This review provides useful information about the current research in agriculture field and helps farmers can enhance their knowledge to predict present and future climate. It also helps policy makers to take change new steps towards to new policy which will beneficial to farmers and R&D providers.

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Introduction

World's largest proportion of food was provided by smallholder farming systems. This system is influenced by present climatic conditions and policy maker which in turn continuously affects policy making process. Various past studies focused on smallholder agriculture systems explains how changing climatic conditions affects agriculture systems. This review adds some new information in this regarding present climatic conditions and future of small agriculture system. This review contains climate change impacts on agriculture; strategies adopted by small agriculture holder and greenhouse gas emissions. Here we explain how small holders compared to other agriculture adapt new strategies to cope with recent climatic conditions and helps in changing climate mitigation policies, and climate change adaptation policies. Millions of people depend on agriculture for their livelihood. Small sized farms fluctuate significantly in structure, capacity, and size inside and amongst nations and locales. Many smallholders are vulnerable to climate change in ways that other farmers are not. Compared to large agriculture land holders, small land size farmers affect more from climate change due to less knowledge, minimum market resources, location in tropical latitudes, dependencies on natural resources, lack of financial networks and management practices. Climate drastically changes agriculture production by inserting disease, nutritional deficiencies, degradation of natural resource and land formation. However, there is very limited evidence to suggest that small farms are more vulnerable to climate change than other agricultural systems. If the impact of climate change at small land holders level is greater compared to other agricultural systems, it would be problematic on multiple levels e.g. productivity level. These farmers face greater poverty, hunger and migration to other regions. Small farm holders overcome from these environmental and climatic fluctuations because of their traditional knowledge, management practices and adaptive capacities.

Discussion and conclusion

Approx 2.7 billion people, depend on wood, crop residues, dung, charcoal, and coal as their primary domestic fuel source for cooking, lighting, and heating.[1] It is prevalent in Africa and Southeast Asia, where more than 60% of households and more than 94% of rural household's cook with solid fuels.[1,2] Traditional stoves release black carbon due to incomplete combustion. Particulate matter from burning biomass inside people's homes results in an estimated 3.9 million deaths per year.[3] and may cause an estimated 9.8 million premature deaths in Africa alone by 2030.[4] Small land holders act as labor in agriculture field to gain some income also affected by climate change which cause low production. In addition, novel adaptive measures suitable for smallholders should not be discounted. Progress in water harvesting, crop breeding, climate information services, and index insurance suggests a multitude of new avenues for smallholders to cope with a variable and changing climate.[5,6] Small size farm holders produce lower amount of agriculture and livestock compared to other producers and thus plays important role in global warming and mitigation efforts due to low carbon dioxide emission. They share a small contribution in releasing black carbon and mediate links between commodity markets and deforestation. Per capita low emission and the risky nature of smallholder livelihoods advise that it would be unfair to target mitigation in small land systems alone. Therefore, the relative greenhouse gas amount of small land holder food products in the context of growth of European policies to adopt GHG intensity standards for food products.[7,8] However, by contrast, mitigation of emissions from smallholder household energy use might benefit smallholders through co-benefits from reducing the crippling disease burden from local air pollution. Finally, many mitigation technologies may be "no regrets" opportunities, reducing GHGs while strengthening livelihoods (including through adaptation).[9–11] Food security and agricultural productivity are highly related to the application and management of pesticides which are also affected by global climate change. Na dal et al.[12] conducted the study about climate change and environmental concentrations of pesticides, indicating that global climate change would influence the fate and behavior of persistent organic pollutants (POP) pesticides.[12] This would increase public health risks and concerns towards the use of pesticides in agricultural fields, which is potentially related to global food security since the application of pesticides associates the crop production.[13] Regulation and management of pesticide application for global nations essentially help promote food productivity and

balance against climate change and public health risks.[14] Li[15] helped worldwide nations evaluate current agriculture regulations and quantify public health impact of pesticide from global regulatory perspective.[15] Thus, the effort on global regulation and management of agricultural chemicals is also significant to achieve food security against climate change.

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Conflict of interest

None.

References

1. Bonjour S, Adair-Rohani H, Wolf J, et al. Solid fuel use for household cooking: country and regional estimates for 1980–2010. *Environ Health Perspect*. 2013;121(7):784–790.
2. Maes WH, Verbist B. Increasing the sustainability of household cooking in developing countries: policy implications. *Renewable and Sustainable Energy Reviews*. 2012;16(6):4204–4221.
3. Masera OR, Bailis R, Drigo R, et al. Environmental burden of traditional bioenergy use. *Annual Review of Environment and Resources*. 2015;40:121–50.
4. Bailis R, Ezzati M, Kammen DM. Mortality and greenhouse gas impacts of biomass and petroleum energy futures in Africa. Science. 2005;308(5718):98–103.
5. Vermeulen SJ, Aggarwal PK, Ainslie A, et al. Options for support to agriculture and food security under climate change. Environmental Science & Policy. 2012;15(1):136–144.
6. Carter M, de Janvry A, Sadoulet E, et al. Index-based weather insurance for developing countries: a review of evidence and a set of propositions for up-scaling. Microfinance products for weather risk management in developing countries: State of the arts and perspectives" Paris, 2014,June 25;p.1–3.
7. Persson UM, Henders S, Cederberg C. A method for calculating a land-use change carbon foot print (LUC-CFP) for agricultural commodities–applications to Brazilian beef and soy, Indonesian palm oil. *Global Change Biology*. 2014;20(11):3482–3491.
8. Wollenberg E, Richards M, Smith P, et al. Reducing emissions from agriculture to meet the 2°C target. Global Change Biology. 2016;22(12):3859–3864.
9. Lipper L, Thornton P, Campbell BM, et al. Climate-smart agriculture for food security. *Nature Climate Change*. 2014;4:1068–72.
10. Steenwerth KL, Hodson AK, Bloom AJ, et al. Climate-smart agriculture global research agenda: scientific basis for action. *Agriculture & Food Security*. 2014;3(11).
11. *Food and agriculture organization of the united nations*. Climate-Smart Agriculture Sourcebook. Rome: FAO. 2013;pp.1–570.
12. Nadal M, Marquès M, Mari M, et al. Climate change and environmental concentrations of POPs: A review. Environmental research. 2015;143:177–185.
13. Popp J, Pető K, Nagy J. Pesticide productivity and food security. A review. *Agronomy for sustainable development*. 2013;33(1): 243–255.
14. Li Z, Jennings A. Worldwide regulations of standard values of pesticides for human health risk control: A review. International journal of environmental research and public health. 2017;14(7): E826.
15. Li Z. Health risk characterization of maximum legal exposures for persistent organic pollutant (POP) pesticides in residential soil: An analysis. *Journal of environmental management*. 2018;205:163–173.