Published in the Russian Federation
Sochi Journal of Economy
Has been issued since 2007.
ISSN: 2541-8114
2022. 16(2): 134-140

www.vestnik.sutr.ru

Reviews

UDC 33

Climate Change, Health and Productivity of Farmers in West African Economies: An Overview

Jacob Owusu Sarfo [a, *], Edward Wilson Ansah [a], Mathias Mawuli Ametefe [a], Michael Dari [a], Josephene Edum-Fotwe [a], Paul Obeng [a], Harriet Odoley Charway [c], Francis Appiah Adu-Amankwah [b]

[a] University of Cape Coast, Cape Coast, Ghana
[b] Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[c] University of Ghana, Legon, Accra, Ghana

Abstract

Climate change negatively impacts the environment, human, animal, and aquatic life. Notwithstanding the growing evidence of the influence of climate change on occupational health and safety in developed countries, few reviews have been conducted on its effects on farmers' health and productivity within the West African sub-region. This paper shows that climate change negatively affects West African farmers' physical and mental health. Extreme heat withered crops and prevented them from germinating, while heavy rainfall submerged and destroyed fields. Additionally, this review noted the lack of commitment and political will by governments in West Africa to fight climate change issues. We recommend that governments and other stakeholders in the sub-region support local farmers to implement climate change adaptation measures fully. Furthermore, researchers should work with government agencies, civil society organisations, and farmers to develop sustainable and resilient early warning systems to provide the necessary information and forecasts to help mitigate the harmful effects of climate change on workers and productivity.

Keywords: climate change adaptation measures, climate change, early warning system, farmers' health and productivity, mitigation, West Africa.

1. Introduction

Climate change is a substantial long-term shift in temperatures and weather patterns, including changes in the average weather condition (Hickmann et al., 2021). According to Parry et al. (2007), the global average surface temperature has increased by 0.74 ± 0.18°C from 1906 to 2005, leading to rising sea levels and arctic sea ice shrinking by 2.7 %. Also, they predicted an average temperature rise of 1.5–5.8 °C across the globe during the 21st century, accompanied by increased extreme weather events, including heat waves, floods and droughts. Additionally, they predicted that agricultural waste emissions will increase greenhouse gas (GHG) emissions significantly by 2050. The overwhelming effects of climate change on the environment, human, animal and aquatic life, as a result of the global drive for industrialisation, urbanisation, and the

* Corresponding author
E-mail addresses: jacob.sarfo@ucc.edu.gh (J.O. Sarfo)

use of fossil fuels, can lead to the emission of GHG into the atmosphere. Such situations threaten life on earth which informed the formulation of Sustainable Development Goal 13, "action against climate change" (United Nations, 2015). Globally, climate change affects the health and safety of workers, especially those in developing economies (Ansah et al., 2021).

It is essential to note that the worker's health and productivity are inseparable (Flouris et al., 2021). Thus, the adverse effects of climate change directly impact productivity due to, for instance, lost work time (Flouris et al., 2021; Kjellstrom, Crowe, 2011). Climate change reduces performance during working hours when workers under severe heat stress slow down and take more breaks to rehydrate and cool down. Working under extreme climate conditions can damage health or even lead to death (Dasgupta et al., 2007). Studies using economic models have found that the climate effects on labour are among the most critical drivers of total economic costs of climate change. de Lima et al.'s (2021) study on the impact of climate change on productivity in Asia reported higher levels of productivity loss in regions with climatologically high temperatures and humidity, namely the tropics and monsoonal regions. The combination of extremely higher and significantly lower temperatures results in systematically higher labour reductions capacity of workers in some regions in the deep tropics reducing labour substantially by 30 % to 50 %. Due to heat stress, labourers could only work for a few hours out of the entire working hours assigned, reducing agricultural output and ultimately contributing to food insecurity (de Lima et al., 2021).

Generally, it is difficult to evaluate the effects of climate change within a specific boundary, as the impacts of anthropogenetic activities of one country could be experienced globally (Ceci et al., 2021). The distressing effects of climate change on productivity loss and lost time can be attributed to natural and man-made causes (Ansah et al., 2021). Furthermore, these adverse effects result from institutional failures, increasing vulnerabilities and impeding adaptive capabilities (Chowdhury et al., 2021). Nonetheless, studies have suggested viable interventions and other adaptation strategies to minimise the devastating effects of climate change on productivity and lost work time (Sadiq et al., 2019). Evidence suggests that attempts to increase the acquisition of knowledge on the negative impacts of climate change on productivity loss and lost work time target the population, epidemiological surveillance (Chowdhury et al., 2021), development of adaptation measures, occupational health and safety surveillance, and climate change monitoring tend to help reduce the impact of climate change on productivity loss and lost work time (Kjellstrom, 2016). Therefore, one-stop-shop evidence must be produced to comprehensively analyse the effects of climate change on farmers' health and how that affects their productivity.

In this paper, we briefly reviewed the effects of climate change on farmers' health and productivity and the kinds of mitigation approaches used by these farmers from a West African perspective.

2. Results and discussion

Climate change and farmers' health in West African economies

Like most sub-Saharan African countries, West African economies are particularly vulnerable to the adverse effects of climate change due to individual, environmental and organisational factors (Ansah et al., 2021). Ansah et al. (2021) noted that these countries are faced with challenges regarding adequate adaptation strategies, political will in implementing international and local policies, and expertise and technology to monitor and mount surveillance on climate change. Globally, climate change has led to extreme cold and hot temperatures over the last decade, resulting in lost time as workers either fall sick, work for shorter hours or avoid work entirely due to extreme temperatures (Ceci et al., 2021). A similar trend was noted by Ansah et al. (2021) among workers in sub-Saharan Africa. Consequently, workplace adaptations addressing climate change among vulnerable workers like farmers have proven to lessen the consequences of climate change on productivity loss and lost work time (Sadiq et al., 2019).

Our review found that farmers working in West Africa suffer from extreme ambient heat exposures. The harsh weather conditions pose many health threats to the farmers as they increase the use of pesticides on their farms due to the high devastation activities of pests and the reduction in the efficacy of the pesticides in the tropics of West Africa (Frimpong et al., 2020; Chakraborty, Newton, 2011; Sadiq et al., 2019). Environmental assessment studies have indicated that many pesticides in this region negatively affect the safety of foods and disturb terrestrial and aquatic ecosystems near treated fields (Anakwue, 2019; Onwona-Kwakye et al., 2020). Moreover, Frimpong et al. (2020) noted that farmers in selected communities in the northern part of Ghana were repeatedly exposed to extreme heat as they worked in the fields. Consequently, extreme heat

exposure affects farmers' risk of developing mental illnesses (Acharibasam, Anuga, 2021). Furthermore, Frimpong et al. (2020) observed that farmers in Ghana had poor sleep quality, stress, and chronic work tiredness due to extreme heat. Climate change also increased farmers' risk of developing headaches, dizziness, malaria, body weakness, cough, typhoid fever, skin rashes, and rheumatic pain (Aminu et al., 2021).

3. Climate change and farmers' productivity in West African economies

Food productivity in the West African region is noted to be adversely affected by climate change (Adu-Boahen et al., 2019; Mbuli et al., 2021). As West African farmers suffer from extreme temperatures, increased levels of food pathogen and pest loads on their farms result in greater food spoilage. Mbuli et al. (2021) reported a relationship between climate change, smallholder farmers' productivity, and food security in Cameroon. They observed that climate change results in 10 % to 15 % productivity losses. This trend is similar in other West African countries like Ghana (Adu-Boahen et al., 2019; Naab et al., 2021), Nigeria (Ani et al., 2021; Durodola, 2019; Liverpool-Tasie et al., 2019), Cote d'Ivoire (Koné, 2022), Liberia (Talery, 2020; Topor, 2009) and Sierra Leone (Saravia-Matus et al., 2021). Most studies observed that the consequences of climate change in West Africa include the destruction of food crops by excessive rainfalls, floods waters, or droughts (Ani et al., 2021; Mbuli et al., 2021). For example, there has been a change in rainfall and temperature patterns over the past two decades, with a significant shift in the onset of rainfall and dry seasons in countries like Ghana (Addaney et al., 2021; Sugri et al., 2021). Other studies revealed that the changes in rainfall and temperature patterns directly affect productivity as it makes accurate planning for production difficult and leads to loss of livelihoods (Mbuli et al., 2021; Sugri et al., 2021). Also, excessive heat from the sun was observed to have led to crops drying up and exacerbating the problem of bushfires which end up destroying food crops (Mbuli et al., 2021).

From our review, climate change affects West African food productivity in two main ways: rainfall and heat patterns or farmers' work environment. Moreover, we noted that there had been changes in rainfall and temperature patterns over the past two decades, with significant changes in the onset of rainfall and prolonged dry seasons. This trend negatively affects productivity as it makes accurate planning for production difficult and not only to productivity loss but also loss of livelihood (Mbuli et al., 2021). For instance, Baig et al. (2022) observed in India that climate change due to carbon emission into the atmosphere decreased the overall rice production due to "shock rainfall" or excessive rainfall. Besides, de Lima et al. (2021) observed that extremely higher and lower temperatures progressively resulted in higher labour capacity reductions of Asian workers by 30 % to 50 %. According to Masuda et al. (2021), as climate change leads to extreme heat conditions that affect workers negatively, workers usually adapt to extreme heat conditions by taking frequent breaks rather than adjusting the speed or effort of work, leading to declining productivity of up to 39 % on average.

Climate change mitigating measures against health and productivity of farmers in West African economies

Several studies have established that the most crucial factor in reducing the impact of climate change lies in the commitment of governments, organisations, and populations who prioritise climate change issues (Ceci et al., 2021; Mbuli et al., 2021). It has been established that there are national policies and international conventions on climate change; thus, implementing those policies is one of the critical ways of preventing the effects of climate change on productivity (Mbuli et al., 2021). This position, according to studies, is premised on the fact that there are many national policies targeted at fighting climate change across most West African countries, as well as international climate change conventions that bind these countries (Fagariba et al., 2018). However, the challenge lies in the lack of political will, lack of commitment and unwillingness of politicians to prioritise and commit resources towards fighting the course of climate change issues. It has been established that there are national policies and international conventions on climate change; thus, implementing those policies is an important way of preventing climate change's effects on productivity (Mbuli et al., 2021).

It could be argued that sharing information from the "scientific community" through research into how the planet's climate is changing, relating weather forecasts to other pertinent areas of the economy, funding governmental organisations tasked with addressing climate change issues, and ensuring well-functioning early-warning systems would help minimise the damage caused by excessive rain and extreme heat (Ceci et al., 2021; Mbuli et al., 2021). This position is

also corroborated by studies outside the sub-region (Chowdhury et al., 2021; Dasgupta et al., 2021). These studies found that among the main factors contributing to climate change issues in the sub-region are political governments' lack of preparedness, absence of adaptation measures, the poor political will to implement international and local policies, and lack of expertise and technology to monitor and install early warning systems. According to the findings from this review, what made the situation worse was corruption on the part of West African leaders, who misappropriated funds from donor agencies meant to fight the effects of climate change for the good of the entire globe (Opoku et al., 2022). Besides, Chowdhury et al. (2021) and Kjellstrom (2016) observed that attempts to increase the acquisition of knowledge on the adverse effects of climate change on workers' health and productivity helps improve outcomes. Also, utilising these negative effects, developing adaptation measures, occupational health and safety surveillance, and climate change monitoring tend to help reduce the impact of climate change on productivity loss and lost work time.

Using fuel replacements and energy conservation measures such as switching from fossil fuels and other energy sources that release GHG to cleaner alternatives are ways to lessen the effects of climate change on productivity. These adaptive measures have been recognised as effective mitigating techniques with carbon capture and storage technology to reduce the number of GHG discharged into the atmosphere (Mong et al., 2021). Additionally, domestication programs and legislation in the forestry sector, recycling and reducing food waste, creating gene banks to prevent forest species extinction, conducting research on various aspects of the earth's changing climate based on a multi-disciplinary approach to generate reliable empirical data, and more, have been identified as the best methods of mitigating climate change (Dasgupta et al., 2021; Fagariba et al., 2018; Mong et al., 2021).

Finally, the review identified that government agencies and other vital stakeholders assist farmers in identifying the most effective and practical adaptation strategies appropriate for improving the community climatic conditions to support agriculture's growth and improve living conditions. For example, officials reported assisting farmers in Ghana to practice agroforestry, adopt drought-resistant plants, use organic manure/mulching and varied planting seasons, and adopt various agricultural methods and alternative livelihoods (Fagariba et al., 2018). Frimpong et al. (2020) also observed that less than 60 % of farmers selected different adaptation strategies for heat stress in Ghana. They noted that farmers minimised the room heat during the day by opening doors and windows and using room-standing fans. On the farms, less than 30 % of the farmers accepted effective adaption strategies to limit their levels of heat exposure by getting away to a shade for a while, wearing an airy dress and hats, drinking more water, and eating local food. Notably, less than 5 % engaged in ineffective measures like removal of clothing for free air but directly exposed to sunshine (Fagariba et al., 2018). Although West African farmers are interested in effectively adapting to climate change at the domestic and agricultural levels, they are primarily challenged by the financial demands to deal with extreme heat exposure, lack of adequate supply of quality water, corruption, and conflicts as they try to implement these strategies (Fagariba et al., 2018).

3. Conclusion

Climate change negatively affects the health and productivity of farmers in the West African sub-region. We found that the effects of climate change might result in a complete loss of production and quality of health as well as, in some situations, a loss of life. Extreme heat from the sunburn withers crops and, in certain circumstances, prevents them from germinating, whereas heavy rainfall submerges and destroys fields. Climate change effects like extreme heat, excessive downpours, drought, and variations in the regular seasons have led to productivity loss, physical and mental health problems among farmers, and lost work time. Our review also reported the lack of commitment and political will by governments in West Africa in implementing adaptation measures and strengthening institutions to fight the effects of climate change. Efforts need to be made by governments and other key stakeholders in West Africa to fully implement local policies and international conventions aimed at combating climate change. West African governments should commit resources to the necessary state agencies responsible for climate change research and support farmers to implement effective climate change adaptation interventions. The negative consequences of climate change on farmers' productivity and health should be lessened by actions like the development of early warning systems that deliver timely information about climatic variability to farmers.

4. Directions for future studies

Our findings suggest that future studies must explore local climate change adaptation measures and interventions among farmers and other outdoor workers in West African economies. Furthermore, future studies may look at the existing early warning systems to mitigate the impact of climate change in different locations in West Africa.

5. Directions for policy

Governments and other stakeholders need to support the implementation of existing policies and conventions on climate change. Formulation and operationalisation of new approaches based on research evidence to meet the changing needs of climate change issues are necessary for effective mitigation. The impact of climate change should be prioritised to achieve Sustainable Development Goal 13-climate action.

6. Declaration of conflicting interest

The authors declare that they have no known conflicting personal or financial interests regarding the conduct of this study that could have affected the findings reported.

References

Acharibasam, Anuga, 2021 – *Acharibasam, J.W., Anuga, S.W.* (2018). Psychological distance of climate change and mental health risks assessment of smallholder farmers in Northern Ghana: Is habituation a threat to climate change? *Climate Risk Management*. 21: 16-25.

Addaney et al., 2021 – *Addaney, M., Asibey, M.O., Cobbinah, P.B., Akudugu, J.A.* (2021). Climate change in rural Ghana: Perceptions and adaptive responses. *Local Environment*. 26(12): 1461-1479.

Adu-Boahen et al., 2019 – *Adu-Boahen, K., Dadson, I.Y., Halidu, M.A.* (2019). Climatic variability and food crop production in the Bawku West District of the Upper East Region of Ghana. *Ghana Journal of Geography*. 11(1): 103-123.

Aminu et al., 2021 – *Aminu, F.O., Ladapo, H.L., Akhighe-Ahonkhai, E.C., David, M.O.* (2021). Climate change variability and associated health effects among farming households in Ondo State, Nigeria. *Innovare Journal of Agricultural Science*. 9(4): 10-13.

Anakwue, 2019 – *Anakwue, R.* (2019). Cardiotoxicity of pesticides: Are Africans at risk? *Cardiovascular Toxicology*. 19(2): 95-104.

Ani et al., 2021 – *Ani, K.J., Anyika, V.O., Mutambara, E.* (2021). The impact of climate change on food and human security in Nigeria. *International Journal of Climate Change Strategies and Management*. 14(2): 148-167.

Ansah et al., 2021 – *Ansah, E.W., Ankomah-Appiah, E., Amoadu, M., Sarfo, J.O.* (2021). Climate change, health and safety of workers in developing economies: A scoping review. *The Journal of Climate Change and Health*. 3: e100034.

Baig et al., 2022 – *Baig, I.A., Chandio, A.A., Ozturk, I., Kumar, P., Khan, Z.A., Salam, M.* (2022). Assessing the long-and short-run asymmetrical effects of climate change on rice production: Empirical evidence from India. *Environmental Science and Pollution Research*. 29(23): 34209-34230.

Ceci et al., 2021 – *Ceci, P., Monforte, L., Perelli, C., Cicatiello, C., Branca, G., Franco, S., … Scarascia Mugnozza, G.* (2021). Smallholder farmers' perception of climate change and drivers of adaptation in agriculture: A case study in Guinea. *Review of Development Economics*. 25(4): 1991-2012.

Chakraborty, Newton, 2011 – *Chakraborty, S., Newton, A.C.* (2011). Climate change, plant diseases and food security: An overview. *Plant Pathology*. 60(1): 2-14.

Chowdhury et al., 2021 – *Chowdhury, M.A., Hasan, M.K., & Islam, S.L.U.* (2021). Climate change adaptation in Bangladesh: Current practices, challenges and way forward. *The Journal of Climate Change and Health*. 6: e100108.

Dasgupta et al., 2007 – *Dasgupta, S., van Maanen, N., Gosling, S.N., Piontek, F., Otto, C., Schleussner, C.F.* (2021). Effects of climate change on combined labour productivity and supply: An empirical, multi-model study. *The Lancet Planetary Health*. 5(7): e455-e465.

de Lima et al., 2021 – *de Lima, C.Z., Buzan, J.R., Moore, F.C., Baldos, U.L.C., Huber, M., Hertel, T.W.* (2021). Heat stress on agricultural workers exacerbates crop impacts of climate change. *Environmental Research Letters*. 16(4): e044020.

Durodola, 2019 – *Durodola, O.S.* (2019). The impact of climate change induced extreme events on agriculture and food security: A review on Nigeria. *Agricultural Sciences*. 10(4): 487-498.

Fagariba et al., 2018 – Fagariba, C.J., Song, S., Soule Baoro, S.K.G. (2018). Climate change adaptation strategies and constraints in Northern Ghana: Evidence of farmers in Sissala West District. *Sustainability*. 10(5): e1484.

Flouris et al., 2021 – *Flouris, A.D., Dinas, P.C., Ioannou, L.G., Nybo, L., Havenith, G., Kenny, G.P., Kjellstrom, T.* (2018). Workers' health and productivity under occupational heat strain: A systematic review and meta-analysis. *The Lancet Planetary Health*. 2(12): e521-e531.

Frimpong et al., 2020 – *Frimpong, K., Odonkor, S.T., Kuranchie, F.A., Nunfam, V.F.* (2020). Evaluation of heat stress impacts and adaptations: Perspectives from smallholder rural farmers in Bawku East of Northern Ghana. *Heliyon*. 6(4): e03679.

Hickmann et al., 2021 – *Hickmann, T., Widerberg, O., Lederer, M., Pattberg, P.* (2021). The United Nations Framework Convention on Climate Change Secretariat as an orchestrator in global climate policymaking. *International Review of Administrative Sciences*. 87(1): 21-38.

Kjellstrom, 2016 – Kjellstrom, T. (2016). Impact of climate conditions on occupational health and related economic losses: A new feature of global and urban health in the context of climate change. *Asia Pacific Journal of Public Health*. 28(2_suppl): 28-37.

Kjellstrom, Crowe, 2011 – *Kjellstrom, T., Crowe, J.* (2011). Climate change, workplace heat exposure, and occupational health and productivity in Central America. *International Journal of Occupational and Environmental Health*. 17(3): 270-281.

Koné, 2022 – *Koné, I.* (2022). Local cotton farmers' perceptions of climate change events and adaptations strategies in Cotton Basin of Cote d'Ivoire. [Electronic resource]. URL: https://ssrn.com/abstract=4073114

Liverpool-Tasie et al., 2019 – *Liverpool-Tasie, L.S.O., Sanou, A., Tambo, J.A.* (2019). Climate change adaptation among poultry farmers: Evidence from Nigeria. *Climatic Change. 157*(3): 527-544.

Masuda et al., 2021 – *Masuda, Y.J., Garg, T., Anggraeni, I., Ebi, K., Krenz, J., Game, E.T., ... Spector, J.T.* (2021). Warming from tropical deforestation reduces worker productivity in rural communities. *Nature Communications*. 12(1): 1-8.

Mbuli et al., 2021 – *Mbuli, C.S., Fonjong, L.N., Fletcher, A.J.* (2021). Climate change and small farmers' vulnerability to food insecurity in Cameroon. *Sustainability*. 13(3): e1523.

Mong et al., 2021 – *Mong, I.K., Duru, C.K., Eze, M.I.* (2021). Business organisation and climate change coping strategies in South-East States, Nigeria. *ABSU Journal of Educational Studies*. 8(2): 1-17.

Naab et al., 2021 – *Naab, F.Z., Abubakari, Z., Ahmed, A.* (2019). The role of climate services in agricultural productivity in Ghana: The perspectives of farmers and institutions. *Climate Services*. 13: 24-32.

Opoku et al., 2022 – *Opoku, P., Mensah, H., Somuah, D. P., Opoku, D. A., King, R.* (2022). political economy analysis of how corruption affects climate change adaptation and mitigation. A Case study of the forest and land use sectors of Ghana. *African Journal on Land Policy and Geospatial Sciences*. 5(3): 594-610.

Onwona-Kwakye et al., 2020 – *Onwona-Kwakye, M., Hogarh, J.N., & Van den Brink, P.J.* (2020). Environmental risk assessment of pesticides currently applied in Ghana. *Chemosphere*. 254: e126845.

Parry et al., 2007 – *Parry, M. L., Canziani, O., Palutikof, J., Van der Linden, P., Hanson, C. (Eds.).* (2007). Climate change 2007-impacts, adaptation and vulnerability: Working group II contribution to the fourth assessment report of the Intergovernmental Panel on Climate Change (Vol. 4). Cambridge University Press.

Sadiq et al., 2019 – *Sadiq, L.S., Hashim, Z., Osman, M.* (2019). The impact of heat on health and productivity among maise farmers in a tropical climate area. *Journal of Environmental and Public Health*. 2019: e9896410.

Saravia-Matus et al., 2021 – *Saravia-Matus, S., Amjath-Babu, T.S., Aravindakshan, S., Sieber, S., Saravia, J.A., Gomez y Paloma, S.* (2021). Can enhancing efficiency promote the economic viability of smallholder farmers? A case of Sierra Leone. *Sustainability*. 13(8): e4235.

Sugri et al., 2021 – *Sugri, I., Abubakari, M., Owusu, R.K., Bidzakin, J.K.* (2021). Postharvest losses and mitigating technologies: Evidence from upper East Region of Ghana. *Sustainable Futures*. *3*: 100048.

Talery, 2020 – *Talery, C.V.* (2020). Assessment of smallholder farmers strategies and adaptive capacities to climate change (Doctoral dissertation, Van Hall Larenstein).

Topor, 2009 – *Topor, W.E.* (2009). Priorities and Challenges of Adaptation to the Impacts of Climate Change—A Focus on the Liberian Agricultural Sector (An Issue Paper). United Nations Development Program (UNDP): Liberia Global Project Team, 20.

United Nations, 2015 – United Nations. Transforming our world: The 2030 agenda for sustainable development. New York: United Nations Publishing, 2015.

УДК 33

Изменение климата, здоровье и производительность фермеров в странах Западной Африки: обзор

Джейкоб Овсу Сарфо [a, *], Эдвард Уилсон Анса [a], Матиас Мавули Аметефе [a], Майкл Дари [a], Жозефина Эдум-Фотве [a], Пол Обенг [a], Гарриет Одоли Чарвей [c], Фрэнсис Аппиа Аду-Аманква [b]

[a] Университет Кейп-Кост, Кейп-Кост, Гана
[b] Университет науки и технологий Кваме Нкрума, Кумаси, Гана
[c] Университет Ганы, Легон, Аккра, Гана

Аннотация. Изменение климата негативно влияет на окружающую среду, человека, животных и водную жизнь. Несмотря на растущее количество данных о влиянии изменения климата на охрану труда и технику безопасности в развитых странах, было проведено недостаточно обзоров его воздействия на здоровье и производительность фермеров в западноафриканском субрегионе. В статье обсуждается, что изменение климата негативно влияет на физическое и психическое здоровье западноафриканских фермеров. Сильная жара привела к увяданию посевов и препятствовала их прорастанию, а проливные дожди затопили и уничтожили поля. Кроме того, в обзоре авторами отмечается отсутствие политического воздействия со стороны правительств Западной Африки в борьбе с проблемами изменения климата. Мы рекомендуем правительствам и другим заинтересованным сторонам в субрегионе поддерживать местных фермеров в полной реализации мер по адаптации к изменению климата. Кроме того, исследователи должны работать с государственными учреждениями, общественными организациями и фермерами для разработки устойчивых систем раннего предупреждения, обеспечивающих предоставление необходимой информации и прогнозов, помогающих смягчить пагубные последствия изменения климата для работников и производительной отрасли.

Ключевые слова: меры по адаптации к изменению климата, изменение климата, система раннего предупреждения, здоровье и продуктивность фермеров, смягчение последствий, Западная Африка.

[*] Корреспондирующий автор
Адреса электронной почты: jacob.sarfo@ucc.edu.gh (Д.О. Сарфо)