WEALTH CREATION AND ACCUMULATION IN NIGERIA: CLIMATE-SMART AGRICULTURE (CSA) PRACTICES AND EDUCATION LINKAGES—CASE OF ENUGU FARMERS

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Abstract
This study explores the interconnections between Climate-Smart Agriculture (CSA) practices, education, and wealth creation among farmers in Enugu state, Nigeria. As climate change increasingly impacts agricultural productivity, adopting CSA practices can enhance resilience and economic stability. This research investigates how education serves as a catalyst for implementing CSA and ultimately contributes to wealth accumulation in farming communities. Utilizing qualitative and quantitative data, the findings highlight the importance of integrated approaches that combine sustainable agricultural practices with education to foster economic growth and resilience.
Keywords: Wealth creation, Climate-Smart Agriculture, Education, Sustainable agriculture

INTRODUCTION

Nigeria's agricultural sector is a vital component of the economy, employing a significant portion of the population and contributing to national GDP. However, the challenges posed by climate change—such as erratic rainfall patterns, increased temperatures, and extreme weather events—threaten agricultural productivity and, consequently, farmers' livelihoods. CSA is defined as agricultural practices that sustainably increase productivity and system resilience while reducing greenhouse gas emissions (FAO, 2013). CSA is a concept that calls for integration of the urgent sustainable-environment and agricultural practices, climate-change adaptation and the possibility of moderation in agricultural growth strategies to support food security (Ripple et al., 2014). In this context, Climate-Smart Agriculture (CSA) emerges as a promising solution that promotes sustainable farming practices aimed at enhancing productivity while mitigating climate impacts.

The implementation of CSA in Nigeria has gained momentum, particularly as farmers seek ways to adapt to changing environmental conditions. CSA emphasizes practices that improve resilience, reduce greenhouse gas emissions, and enhance soil health (John, 2005). For farmers in Enugu, integrating CSA with education can provide the necessary knowledge and skills to adopt innovative agricultural practices that contribute to wealth creation.

On the other hand, education plays a critical role in empowering farmers with the knowledge needed to implement CSA effectively. By fostering awareness of sustainable practices and the benefits of CSA, educational initiatives can significantly enhance farmers' capabilities, leading to improved agricultural outcomes and increased income (Rainforest Alliance, 2019). This paper examines the interplay between CSA, education, and wealth accumulation in Enugu state, shedding light on effective strategies for enhancing agricultural productivity and economic stability. Moreover, the study highlights the importance of local contexts in shaping agricultural practices. Understanding the specific needs, challenges, and opportunities of Enugu farmers can inform the development of targeted interventions that maximize the benefits of CSA and education for wealth creation.

The primary purpose of this study is to investigate the linkages between Climate-Smart Agriculture (CSA), education, and wealth creation among farmers in Enugu State, Nigeria. By analyzing these relationships, the study identified best practices and strategies that can enhance farmers' economic resilience in the face of climate change. A secondary objective was to explore how educational interventions can facilitate the adoption of CSA practices among farmers. Understanding the role of education in promoting CSA is critical for developing effective programs that empower farmers to innovate and improve their livelihoods. Additionally, this research assessed the socio-economic impacts of CSA and education on farming communities in Enugu. By examining the direct and indirect benefits of these strategies, the study provides evidence-based recommendations for policymakers and agricultural stakeholders. Again, the study contributes to the broader discourse on sustainable agricultural practices and their role in wealth creation in Nigeria. By focusing on the case of Enugu farmers, this research highlights local experiences and insights that can inform national and regional agricultural policies.

Theoretical foundation/framework

This study is grounded in the Sustainable Livelihoods Framework (SLF), which emphasizes the importance of diverse assets—human, social, natural, physical, and financial—for promoting economic resilience. The SLF highlights how integrating these assets can enhance farmers' capacities to adapt to changing environmental conditions, thereby supporting wealth creation. The framework also draws on the concept of Knowledge Transfer Theory, which posits that effective education and training programs can significantly enhance farmers' understanding of innovative practices (Natarajan, Newsham, Rigg & Suhardiman, 2022). This theory underscores the role of education in empowering farmers to adopt CSA, thereby improving productivity and income levels.

Further, this study incorporates principles of Adaptive management, which emphasizes the need for flexible and iterative approaches to agricultural practices in response to environmental changes (Williams & Brown, 2014). This principle aligns with the goals of CSA, which seeks to adapt agricultural systems to mitigate the impacts of climate change while maximizing productivity.

METHODOLOGY

This study employs a mixed-methods approach, combining quantitative surveys and qualitative interviews to gather comprehensive data on the relationship between CSA, education, and wealth creation among farmers in Enugu State. Quantitative data was collected from a total of 120 respondents randomly selected via a list of registered farmers obtained from Agricultural Development Program (ADP) headquarters through structured surveys. The survey assessed farmers' knowledge of CSA practices, their level of education, and their economic outcomes, including income levels and wealth accumulation. Qualitative data was obtained through semi-structured interviews with selected farmers, agricultural extension workers, and educators. These interviews provide in-depth insights into the experiences and perceptions of farmers regarding CSA and the role of education in facilitating wealth creation. Data analysis involve statistical techniques to identify correlations and trends in the quantitative data, alongside thematic analysis of qualitative responses to extract key themes and insights. This comprehensive approach enabled a nuanced understanding of the interplay

between CSA, education, and wealth accumulation in Enugu.

Literature review

The literature on Climate-Smart Agriculture (CSA) emphasizes its potential to enhance agricultural productivity while mitigating the impacts of climate change. CSA practices, such as agroforestry, conservation agriculture, and integrated pest management, have been shown to improve soil health, increase crop yields, and promote biodiversity (FAO, 2017). Studies indicate that adopting CSA can lead to improved food security and economic resilience, particularly in vulnerable communities (Lipper, 2014).

In Nigeria, the agricultural sector faces significant challenges related to climate change, with studies highlighting the increasing vulnerability of farmers to extreme weather events (Adesina, 2019). The need for adaptive strategies, such as CSA, has become increasingly urgent as farmers seek ways to sustain their livelihoods in the face of these challenges.

Education is widely recognized as a crucial factor in promoting sustainable agricultural practices. Research indicates that farmers with higher levels of education are more likely to adopt innovative practices, including CSA (Borkowski, 2020). Education enhances farmers' ability to access information, understand new technologies, and implement best practices, leading to improved productivity and income.

The intersection of CSA, education, and wealth creation has been explored in various contexts. For example, research in Ethiopia demonstrates that integrating educational initiatives with CSA practices can significantly enhance farmers' economic outcomes (Berhe, 2018). This highlights the importance of holistic approaches that consider both agricultural practices and education in promoting sustainable livelihoods.

Moreover, the role of social capital in facilitating the adoption of CSA has been emphasized in literature. Studies show that farmers with strong social networks are more likely to share knowledge and resources, leading to increased adoption of innovative practices (Pérez, 2020). This underscores the importance of community engagement in promoting CSA and wealth accumulation.

The existing body of research supports the notion that education and CSA are interdependent factors that contribute to wealth creation in agricultural communities. By fostering an environment of learning and innovation, communities can enhance their resilience to climate change and improve their economic stability. Further, literature indicates a growing recognition of the need for policy interventions that support the integration of CSA and education in agricultural development strategies. Policymakers are increasingly focusing on creating enabling environments that facilitate knowledge transfer and the adoption of sustainable practices (World Bank, 2020).

Climate-Smart Agriculture (CSA)

Climate-Smart Agriculture (CSA) is defined by its focus on sustainable practices that enhance productivity, build resilience to climate change, and reduce greenhouse gas emissions. CSA encompasses a variety of techniques, including improved crop varieties, efficient water management, and agroecological practices that enhance soil fertility and biodiversity. Furthermore, CSA has significant potential for enhancing economic outcomes in rural communities. This economic dimension is crucial in the context of Nigeria, where many communities depend on agriculture for their livelihoods. By increasing agricultural productivity and resilience, CSA practices can contribute to higher income levels and improved livelihoods for farmers. CSA offers a pathway to improve food security

while promoting environmental sustainability (John, 2005).

Education plays a vital role in facilitating the adoption of CSA among farmers. By providing knowledge and skills related to sustainable practices, education can empower farmers to make informed decisions that enhance their agricultural productivity and wealth accumulation. Farmers can increasingly recognize the importance of sustainable practices to maintain productivity in the face of changing weather patterns (World Bank, 2021). In Nigeria, the adoption of CSA practices is essential for addressing the challenges posed by climate change.

Agricultural practices in Nigeria

Agricultural practices in Nigeria are diverse, reflecting the country's varied agro-ecological zones. However, many traditional practices are facing challenges due to climate change, land degradation, and inadequate access to resources. The reliance on rain-fed agriculture makes farmers particularly vulnerable to climate variability. To address these challenges, there is a growing emphasis on adopting sustainable agricultural practices, including CSA. These practices promote soil health, conserve water, and improve crop resilience to climate stressors. Integrating CSA into existing agricultural systems can enhance productivity and support food security (Saliu, 2018).

Education and training are essential for promoting the adoption of sustainable agricultural practices. Additionally, collaborative efforts between government, NGOs, and local communities are essential for promoting sustainable agricultural practices. By fostering partnerships and providing support for educational initiatives, stakeholders can create enabling environments that facilitate the adoption of CSA in Nigeria. By equipping farmers with the knowledge and skills necessary to implement CSA, educational initiatives can facilitate the transition to more resilient agricultural systems (World Bank, 2021). This transition is crucial for ensuring the long-term sustainability of Nigeria's agricultural sector.

Interconnection between climate, agriculture, education, and wealth creation in Nigeria

The interconnection between climate, agriculture, education, and wealth creation in Nigeria is increasingly evident. Climate change poses significant risks to agricultural productivity, impacting the livelihoods of millions of farmers. As weather patterns become more erratic, the need for adaptive agricultural practices, such as CSA, becomes critical (Rainforest Alliance, 2019). Education serves as a key driver in this context, equipping farmers with the knowledge needed to implement sustainable practices. By enhancing awareness of the impacts of climate change and the benefits of CSA, educational initiatives can promote informed decision-making among farmers. Moreover, the relationship between agricultural productivity and wealth creation is direct. Higher yields and improved crop resilience lead to increased income for farmers, enabling them to invest in their livelihoods and enhance their overall well-being. This economic empowerment is particularly important in rural areas, where agriculture is often the primary source of income (World Bank ,2021).

The integration of CSA and education can create a positive feedback loop, where improved agricultural practices lead to increased wealth, which in turn allows for further investments in education and sustainable practices. This holistic approach can contribute to long-term economic resilience in farming communities (Saliu, 2018). Additionally, the socio-economic impacts of climate change on agriculture underscore the need for comprehensive strategies that address both environmental and economic challenges. By recognizing the

interconnectedness of these factors, stakeholders can develop more effective policies and interventions that promote sustainable agricultural development in Nigeria.

Education and agricultural innovation in Nigeria

Education plays a pivotal role in fostering agricultural innovation in Nigeria. By providing farmers with access to information and resources, educational initiatives can promote the adoption of innovative practices that enhance productivity and sustainability. Training programs focused on CSA have shown promise in empowering farmers to adopt new technologies and practices. By enhancing farmers' understanding of sustainable agriculture, education can facilitate the transition to more resilient agricultural systems (Saliu, 2018). This is particularly important in the context of climate change, where adaptive strategies are crucial for maintaining productivity.

Furthermore, education is a critical component of promoting agricultural innovation in Nigeria. By equipping farmers with the knowledge and skills necessary for adopting sustainable practices, educational initiatives can contribute to enhanced productivity and wealth creation. Again, the integration of education into agricultural extension services can enhance the dissemination of knowledge and best practices among farmers. Collaborative efforts between government agencies, NGOs, and local communities can create effective channels for delivering educational content and fostering innovation. The role of education in promoting agricultural innovation also extends to research and development. By fostering partnerships between educational institutions and agricultural stakeholders, Nigeria can enhance its capacity for innovation and improve the resilience of its agricultural sector (John, 2005).

Result

Farmers' Willingness-To-Adopt (WTA) selected and improved CSA practices

The result of the willingness-to-adopt (WTA) selected and improved CSA practices among farmers is presented in Table 1.

Table 1: Frequency of Willingness-to-Adopt

CSA Practices	Willingness to Adopt (WTA)	
Selected and improved CSA practices	**Frequency**	**Percentage (%)**
Improved livestock breeds and species	14	11.7
Improved Strip cropping technology	32	26.7
Improved Cover cropping technology	54	45.0
Improved Application of pesticides and herbicides	96	80.0
Improved Mulching technology	102	85.0
Multiple cropping technology	112	93.3
Improved Water harvesting technology	71	59.1
Improved Terraces	19	15.8

From the willingness to adopt result presented above, it can be deduced that majority (93.3%, 85.0%, 80.0% and 59.1%) of the farmers were willing to adopt multiple cropping technology, mulching technology, application of higher yields manure and water harvesting technology respectively. This means that a majority of the crop farmers are willing to adopt multiple cropping possibly in order to utilize available land resources, deal with paucity of land resource or to adapt to climate change. Multiple cropping has the potential of spreading risk on the farm since different crops has different resistibility. Also, willingness-to-adopt mulching (85.0%) was high among the crop farmers.

Mulched soil also aids resistivity of the farm-layout to withstand washing away of the ridges and heaps cum withstand harsh weather condition on the soil. As the farmers mulch the soil, they adapt to climate change and reduce its effects especially crop farmers growing yams. 80.0% of the farmers were willing-to-adopt chemicals such as herbicide and pesticide in controlling weed growth and controlling pest respectively. The use of herbicide in controlling weed is very effective and fast.

Factors associated with Willingness-To-Adopt CSA practices

The logistic model was applied to investigate factors associated with Willingness-To-Adopt CSA practices. The result is shown in Table 2 and Table 3

Table 2: Model-fit Information

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept only	-17.75656	114.33	199	0.0000
Dependent variable = Farmers' WTA Independent variables = Farmers' socio-economic characteristics				

The result in Table 2 and 3 show that the model passed the test of significance. The Pseudo R-squared value of 0.7630 shows that 76% of the variation in WTA was as a result of the combined effect of variation in the socioeconomic characteristics of the respondents. The model fit information in table 2 show that the independent variables selected statistically influence willingness of farmers to adopt improved CSA technologies.

Table 3: Parameter Estimates

Variables	**Estimate**	**Std. Error**	**z**	**P>|z|**
Age	-.0227391	0.0514929	-0.44	0.659
Gender	-.052799	0.9590693	-0.06	0.956
Marital status	4.176796	1.522641	2.74***	0.006
Education	3.946612	1.163701	3.39***	0.001
Number of employees	0.1502151	0.261099	0.58	0.565
Farming experience	1.077461	0.7808161	1.38	0.168
Household size	0.8776012	0.7107848	1.23	0.217
Membership of Cooperative society	0.6142064	1.243814	0.49	0.621
Farm size	1.361741	0.6889665	1.98**	0.048
Total income	0.0000969	0.0000308	3.15***	0.002
Number of household members receiving income	-0.2492466	0.4531151	-0.55	0.582
Access to remittances	2.308747	1.345391	1.72	0.086
Pseudo R^2	0.7630			

Note: ***, **, and * represent significance at 1%, 5%, and 10%, respectively.

The logistic model in Table 3 show that education, marital status, total income, and farm size were significantly related to WTA, while age, gender, number of employees in the farm, farming experience, household size, belonging to a cooperative society, Number of households receiving income and access to remittances do not show statistically significant relationship to WTA CSA practices. On the other hand, deliberations during the focus group discussions reveal that there is a higher tendency of educated farmers to adopt willing climate change strategies involving

skill or technology compared to uneducated farmers.

Discussion

Several African countries have implemented successful strategies that highlight the linkages between CSA, education, and wealth creation. In Kenya, the adoption of CSA practices among smallholder farmers has been accompanied by targeted educational programs that enhance farmers' understanding of sustainable agriculture. As a result, farmers have reported increased crop yields and improved income levels (Wachira, 2019). In Ethiopia, a study demonstrated that integrating CSA with educational initiatives led to significant improvements in food security and economic resilience among rural communities. Farmers who participated in training programs on CSA practices showed higher adoption rates and improved livelihoods (Berhe, 2018). Ghana's approach to promoting CSA through community-based education programs has also yielded positive results. By engaging local farmers in training sessions, the country has seen increased awareness of sustainable practices and enhanced agricultural productivity (Asante, 2020). These initiatives have contributed to wealth accumulation in farming communities.

In Malawi, a similar model has been employed, where educational interventions focusing on CSA have empowered farmers to adapt to climate change impacts. The integration of education and CSA practices has led to improved agricultural outputs and increased income for participating households (Chimkunda, 2019). South Africa's experience with CSA highlights the importance of policy support for integrating education and sustainable agriculture. Government initiatives aimed at promoting CSA through educational programs have resulted in enhanced farmer knowledge and improved economic outcomes in rural areas (Meyer, 2021). Tanzania has also witnessed positive outcomes from combining CSA and education. Farmers engaged in training on sustainable practices reported increased resilience to climate shocks, leading to enhanced wealth accumulation (Msuya, 2018). This underscores the potential of educational initiatives in promoting adaptive strategies.

From this study, education (3.946612) is statistically significantly related to WTA, and the coefficient is positive, which means that farmers with more years of education have higher WTA. Masud et al. (2015) also reported that literary exposure and enlightenment improved willingness to adopt climate change adaptation strategies. Following, the need for localized educational interventions. By focusing on specific regional contexts, such as Enugu State, the potential for enhancing farmers' capacities and promoting wealth creation becomes increasingly apparent.

Again, marital status (4.176796) statistically significantly influenced farmers WTA improved CSA practices since the coefficient is positive. This indicates that farmers who are married are more willing to adopt CSA practices than their counterpart. Farm size (1.361741) is statistically significant with WTA, and the coefficient is positive. Thus, the higher the farm size, the more farmers are WTA improved CSA practices. This is in conformity with apriori expectations. Al-Amin (2020) also reported that land size plays critical in preconditioning willingness to pay for climate change adaptation strategies, as farmers with more land will want to adopt more. Just like farm size, income (0.0000969) is statistically significant with WTA, and the coefficient is also positive. Thus, the higher the income of the farmers the stronger the WTA. This is in line with Mazzocchi and Sali (2016) who reported that income is important in increasing the willingness of farmers to adopt climate adaptation strategies.

Implications for development

The findings of this study reveal a strong positive relation between the adoption of Climate-Smart Agriculture (CSA) practices and wealth creation among farmers in Enugu State. Farmers who actively engaged in CSA reported higher crop yields, improved income levels, and enhanced economic resilience compared to those who did not adopt these practices. Education emerged as a critical factor influencing the adoption of CSA. Farmers with higher educational attainment demonstrated greater awareness of sustainable practices and were more likely to implement innovative techniques. This highlights the importance of targeted educational interventions in promoting CSA adoption. Qualitative interviews with farmers revealed that access to training programs significantly impacted their understanding of CSA and its benefits. Many respondents emphasized the value of knowledge-sharing and peer learning, suggesting that community-based educational initiatives can enhance the effectiveness of CSA adoption.

Furthermore, the interviews identified that wealth accumulation was not solely dependent on agricultural practices but was also influenced by broader socio-economic factors. Access to credit, market opportunities, and social networks were identified to play significant roles in enabling farmers to invest in CSA and other sustainable practices and enhance their livelihoods.

This emphasizes the need for integrated approaches that combine CSA, education, and supportive policies to maximize economic outcomes for farmers. Collaborative efforts involving government, NGOs, and local communities are essential for creating enabling environments that facilitate the adoption of sustainable practices. Additionally, the findings underscore the importance of addressing barriers to education and access to resources. Ensuring equitable access to educational opportunities and financial support can enhance farmers' capacity to adopt CSA and improve their economic resilience.

In conclusion, the results of this study support the notion that the integration of CSA and education is crucial for fostering wealth creation among farmers in Enugu State. By empowering farmers with knowledge and resources, stakeholders can enhance agricultural productivity and promote sustainable livelihoods.

Conclusion and recommendation

This study highlights the vital role of Climate-Smart Agriculture (CSA) and education in fostering wealth creation among farmers in Enugu State, Nigeria. The interconnections between sustainable agricultural practices, knowledge transfer, and economic resilience underscore the need for integrated approaches to agricultural development. The evidence presented demonstrates that adopting CSA practices, coupled with targeted educational initiatives, can lead to improved agricultural productivity and enhanced income levels for farmers. By empowering communities through education, Nigeria can promote sustainable livelihoods and resilience in the face of climate change.

In summary, the findings of this research provide valuable insights for policymakers and agricultural stakeholders seeking to enhance the economic stability of farming communities in Nigeria. By prioritizing the integration of CSA and education, stakeholders can contribute to a more sustainable and prosperous agricultural sector. Based on the findings of this study, the following recommendations are proposed:

1. Policy integration: Develop policies that promote the integration of Climate-Smart Agriculture (CSA) and education in national agricultural development strategies.
2. Community-based education: Implement community-based educational programs

that focus on CSA practices, enhancing farmers' knowledge and skills for sustainable agriculture.

3. Access to resources: Improve access to financial resources, markets, and extension services for farmers to support the adoption of CSA practices and enhance wealth accumulation.

4. Research and development: Encourage research initiatives that explore innovative agricultural practices and educational methodologies, fostering continuous learning and adaptation among farmers.

Reference

Adesina, A. A. (2019). Climate Change and Agricultural Vulnerability in Nigeria: Impacts and Adaptation Strategies. *Nigerian Journal of Agriculture*, 7(*1*), 23-35.

Asante, F. (2020). The Role of Community Education in Promoting Climate-Smart Agriculture in Ghana. *Journal of Sustainable Agriculture*, 12(*3*), 45-59.

Berhe, M. (2018). Integrating Climate-Smart Agriculture and Education for Improved Livelihoods: Evidence from Ethiopia. *International Journal of Agricultural Sustainability*, 16(*5*), 519-530.

Borkowski, J. (2020). Education and the Adoption of Climate-Smart Agricultural Practices in Sub-Saharan Africa. *Journal of Development Studies*, 56(*4*), 721-737.

Chimkunda, M. (2019). Enhancing Agricultural Resilience through Education and Innovation in Malawi. *African Journal of Agricultural Research*, 14(*7*), 153-162.

FAO. (2017). *Climate-Smart Agriculture: Sourcebook*. US: Food and Agriculture Organization of the United Nations.

Lipper, L. (2014). Climate-Smart Agriculture for Food Security. *Food Security*, 6(*2*), 217-227.

Meyer, S. (2021). Policy Approaches to Promote Climate-Smart Agriculture in South Africa. *Journal of Environmental Management*, 267, 110-117.

Msuya, J. (2018). Impacts of Climate-Smart Agriculture on Farmers' Resilience in Tanzania. *Tanzanian Journal of Agriculture*, 45(*2*), 34-47.

Pérez, J. L. (2020). The Role of Social Capital in the Adoption of Climate-Smart Practices in Rural Communities. *World Development*, 127, 1047-55.

Wachira, F. (2019). The Impact of Climate-Smart Agriculture on Food Security and Farmers' Income in Kenya. *Journal of Agriculture and Food Security*, 8(*1*), 1-13.

World Bank. (2020). *Climate-Smart Agriculture: A Pathway to Resilience and Sustainability in Nigeria*. US: World Bank.

John, V. (2005, 22nd January). *In the land where life is on hold*. Nigeria: The Guardian.

Saliu, A. T. (2018) adoption of climate smart agricultural practices and farmers' willingness to accept incentives in Nigeria. *International Letters of Natural Sciences*, 49, 63-68

FAO (2010). *Climate-Smart Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation*. Rome: FAO.

FAO (2011). Climate Change Mitigation Finance for Smallholder Agriculture: A guide book to harvesting soil carbon sequestration benefits. Rome: FAO

Food and Agriculture Organization of the United Nations (2013). *FAO Statistical Yearbook 2013: World Food and Agriculture*. Rome: FAO.

Natarajan, N., Newsham, A., Rigg, J., Suhardiman, D. (2022). A sustainable livelihoods framework for the 21st century. *World Development*, 155, e105898.

https://doi.org/10.1016/j.worlddev.2022.105898.

Williams, B. K., Brown, E. D. (2014). Adaptive management: from more talk to real action. *Environ Manage.*, 53(*2*), 465-79.

Rainforest Alliance (2019). *What Is Climate-Smart Agriculture?* Accessed from: https://www.rainforest-alliance.org

Mazzocchi, C., & Sali, G. (2016). Sustainability and competitiveness of agriculture in mountain areas: A willingness to pay (WTP) approach. *Sustainability*, 8(*4*), 3-43.

Al-Amin, A. Q., Masud, M. M., Sarkar, M. S. K., Leal Filho, W., & Doberstein, B. (2020). Analysing the socioeconomic and motivational factors affecting the willingness to pay for climate change adaptation in Malaysia. *International Journal of Disaster Risk Reduction*, 50, 10170-84.

Masud, M. M., Junsheng, H., Akhtar, R., Al-Amin, A. Q., & Kari, F. B. (2015). Estimating farmers' willingness to pay for climate change adaptation: the case of the Malaysian agricultural sector. *Environmental Monitoring and Assessment*, 187(*2*), 1-12.

Ripple, W. J., Smith, P., Haberl, H., Montzka, S. A., McAlpine, C., & Boucher, D. H. (2014). Ruminants, climate change and climate policy. *Nature Climate Change*, 4(1), 2-5.