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Keywords: Climate Change, Crop Production, Okra, Tomatoes

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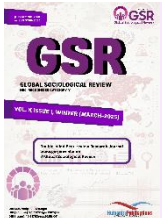

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Contents

Abstract

This study shows how rising temperatures are affecting the growth of Okra and tomato crops in Chak Almas, a village in the district of Jhelum. The research is based on interviews conducted with 30 local farmers who shared their real-life experiences about farming. According to their experience, okra bears better heat than tomatoes. In severe heat, okra continues to grow better, while tomatoes produce smaller fruits and are more likely to fail under high temperatures due to climate change. Farmers shared simple methods that can help keep crops healthy. The methods that are used by farmers include giving shade to protect crops, spraying leaves and watering them regularly, especially when the weather keeps getting hotter due to climate change.

Keywords: Climate Change, Crop Production, Okra, Tomatoes

Introduction

Climate change is causing a rise in temperature globally, which affects the production of many crops, including okra and tomatoes. These two vegetables are important for food and nutrition in many parts of the world, including Pakistan.

Around the world, a rise in temperatures is making it harder to grow crops properly. For example, tomatoes can grow faster in hot weather, but they often produce fewer fruits with lower quality. Similarly, okra plants may grow well in heat, but their fruits can become tough and less tasty if it's too hot due to a change in weather (Utobo et al., 2022).

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As the climate gets hotter, farmers face new challenges and problems because their crops don't grow well. Tomatoes don't perform well in excessive heat, and they often drop flowers that result in fewer fruit production. On the other hand, Okra can handle the heat better and grows well even in high temperatures.

To cope with these issues, farmers must start using new methods and techniques that can help them face the challenges of changing weather. One solution is to plant those types of crops that can sustain in high heat and less water. Experts and researchers are struggling to develop such seeds so that farmers can get a good harvest even when the weather is not beneficial. Another good idea is to change the timing of growing and harvesting crops, so they can escape extreme heat during the hottest months.

Farmers can also use a new type of irrigation to water their fields, like drip irrigation, which saves water and gives plants the required amount of water they need. Using natural fertilizers can make the soil healthy and make the plants stronger against severe heat. It is also very crucial to discuss the new technologies and better ways of farming with the farmers, especially in countries like Pakistan, where people have less knowledge about this.

The government must support the farmers by giving them money and good training so that they can plant their crops even in changing weather. If these steps are not considered, it will become difficult to grow enough food, and many people may struggle with hunger and loss of income because of climate change.

Problem Statement

In Chak Almas, farmers are noticing a lot of changes in their crops because of high temperatures. Many farmers are worried because tomatoes are suffering a lot due to increasing heat and don't produce a good number of fruits. They are trying different methods and techniques to protect their crops from higher temperatures, but the weather keeps getting hotter, so it's getting difficult to save them. So, it's very important to understand the outcomes of increasing heat on the growth of Okra and tomatoes and how farmers save their crops from excessive heat.

The rising temperatures resulting from climate change negatively affect the growth and production of major crops such as okra and tomatoes in Chak Almas. Farmers are bearing increasing challenges as hotter weather leads to reduced crop productivity, poor fruit quality, and increased vulnerability to pests and diseases. While farmers are making efforts to experience better farming techniques, most of them fall short of the tools and technologies needed to save their crops from rising temperatures.

This situation endangers both food security and the economy of farming communities in the region, pointing out the pressing need to understand the impacts of increasing heat on crop growth and to develop practical ways to support farmers facing hardships.

Research Objective

1. To analyse the consequences of high temperature on the productivity of okra and tomato crops
2. To evaluate the changes in plant height, leaf colour, and structure under heat stress.

The goal of the above objectives is to give a thorough understanding of how increasing heat can affect both the productivity and physical features of Okra and tomato crops. By focusing on major indicators such as plant height, leaf colour, and change in structure, we can help understand the urgent need for adaptive farming strategies that can help to cope with the negative impacts of increasing heat on crop growth and quality. These objectives are like a foundation to find possible solutions to support farmers in coping with the problems faced by climate change or changing weather patterns.

Research Question

1. How does high temperature affect the productivity and harvesting of okra and tomatoes?
2. How are changes happening in the height of plants, leaf colour, and structure due to excessive heat?

The above research questions are designed to find out the explicit impacts of increasing heat on the growth,

productivity, and physical characteristics of Okra and tomato crops. By addressing these questions, the study helps to identify key challenges faced by farmers due to climate change and gives insight into how extreme heat affects plant health, growth, and structure. Answering these questions will help understand the issue and can help in the development of adaptive strategies to protect crop production from rising temperatures.

Importance of the Study

Understanding how crops respond to heat helps farmers make better decisions about what to grow and how to care for their fields. This helps make sure there's enough food, even as the climate keeps changing. So, it's important to study this topic for sustainable solutions.

This study is crucial as it helps understand how increasing heat affects the crops and the livelihoods of farmers. A lot of farmers are facing issues like lower crop yields, damaged plants, and more pesticides because of the excessive heat. This makes it harder for them to earn money and grow enough food.

The study shows why it is needed to help farmers learn new technologies and better ways to protect their crops from the increasing heat. It also helps people who set rules and policies to support farmers and ensure food security. The study provides useful information to help communities, organizations, and government work together to solve these problems.

By learning from this study, we can help farmers to protect their crops even in higher temperatures, improve farming, and ensure the sustainability of food for the future.

Study Approach

To find out what is happening, I conducted interviews with 30 farmers in Chak Almas. I conducted simple interviews to know about their experiences and stories in their own words about the production of Okra and Tomatoes. They told us about the problems they are facing and the ways they are trying to adapt to cope with them, such as good irrigation, the best fertilizers, and sprays.

They use a good variety of seeds and a good irrigation system to protect crops from higher temperatures. Farmers told me that by using different sprays and fertilizers, they are protecting their crops from higher temperatures. Good irrigation is very crucial to protect plants from higher temperatures. Using shades and mulching are very important to protect crops from heat.

Review of Literature

Studies showed that heat stress can damage plant growth and their productivity. Okra, which grows naturally in hot climates, is better at handling heat. On the other hand, tomatoes are more brittle, especially when they're flowering. (Kumar et al, 2020)

Sato et al. (2000) found that even a small rise in temperature can reduce tomato fruit production. Wahid et al. (2007) pointed out that extreme heat makes it harder for plants to take in water, breathe, and make their own food through photosynthesis.

Other research shows that okra can still be affected by heat when it goes above 35°C, leading to fewer flowers and fruits (Siemonsma & Kouame, 2004). Tomatoes also lose water and slow down photosynthesis when it's too hot (Hazelton & Muller, 2002).

To help crops handle the hot weather better, researchers suggest using heat-tolerant varieties, watering smarter, using mulch, or applying foliar sprays like gibberellic acid (Journal of Agricultural Science, 2014). These ideas match what farmers in Chak Almas are already doing.

Tehmeena Mukhtar et al. (2020) showed that inoculating tomatoes (Solanum lycopersicum) with Bacillus cereus alleviates heat stress by improving biochemical profiles during elevated temperatures.

Abdel-Fattah et al. (2020) found that delayed planting dates expose okra to heat stress, reducing pod set and yield. They identified heat-tolerant cultivars (e.g., Qena-1, Luxor) under Pakistan/Egypt field conditions.

Bin Khalid et al. (2023) applied 1.5 mM salicylic acid to okra ('Sabzpari'), which improved growth,

chlorophyll, photosynthesis, and biomass under early heat stress.

M.S.H. et al. (2022) evaluated three tomato cultivars under 35–40 °C; 'BARI Tomato-15' maintained higher PSII efficiency, chlorophyll, gas exchange, and antioxidant enzyme activity.

Hayamanesh et al. (2023) evaluated 104 okra genotypes under 45 °C heat shock. They identified physiological markers (e.g., chlorophyll fluorescence, stomatal conductance) and SSR diversity for breeding.

A 2024 study (Gunawardhana & de Silva, 2012) on 63 okra lines exposed to combined drought and heat stress found high heritability (>0.60) for traits like chlorophyll content, biomass, and water retention.

Hussain et al. (2021) demonstrated that exogenous proline sprayed on okra at 45 °C increased shoot/root length, photosynthesis, water-use efficiency, and antioxidant enzymes.

Gunawardhana & de Silva (2021) showed that pot trials at 32–34 °C and 50% water deficit significantly reduced okra growth and yield and altered biochemical parameters.

Udeagbala et al. (2023) used a 40-year time-series ARDL model in Nigeria to show that rising mean temperatures negatively affected both okra and tomato yields in the short and long term.

Yimga Ouonkap et al. (2024) found that heat-tolerant tomato varieties maintain pollen-tube growth under heat by enhancing ROS homeostasis and callose synthesis, preserving fruit and seed production.

Materials and Methods

I communicated with 30 farmers in Chak Almas to know about how increasing heat is affecting their tomato and okra crops. By using simple interviews and field visits, I understood the problems they face and the ways they try to cope with higher temperatures.

Most of the farmers also shared that they are struggling to find proper solutions. Some of them try to water their crops more regularly, but they still face burning of fruits if exposed to intense sunlight. This shows that there is a need to help farmers with new farming techniques and better ways of farming to protect their crops from the harmful effects of rising temperatures.

Methodology

1. Site: Chak Almas, Jhelum
2. Methodology: Exploratory research methodology
3. Method: In-depth interviews
4. Tool: Interview guide
5. Study Type: Qualitative case study
6. Sample size: 30 local farmers, chosen randomly.

Results and Discussions:

Okra

27 out of 30 farmers (90%) said their okra plants grew normally even in the heat. The plants remained green and healthy. But (10%) of farmers said that they feel the blackness in okra due to rising heat.

Tomatoes

22 out of 30 farmers (73%) said their tomato plants showed damage, such as yellowing leaves, curling, and fading. While (27%) said that tomatoes grow well in heat without burning.

Crop Yield

Okra

28 farmers (93%) said regular spraying helped okra produce a good harvest even in the severe heat. While (7%) said that severe heat somehow damages the crops, resulting in lower yield.

Tomatoes

25 farmers (83%) said tomatoes don't do well in the heat. Many tomatoes spoiled or rotted when exposed to direct sunlight. While 17% disagree with that, they shared that tomatoes are heat-tolerant and do well in excessive heat.

Discussion

The analysis shows that okra is better heat-tolerant

than tomatoes, which matches well with previous research like that of Kumar et al. (2020). Tomatoes are very sensitive, especially when they're flowering. Even a small rise in temperature can cause big problems.

Farmers in Chak Almas are doing well with simple solutions like watering more, spraying the plants, and using good fertilizers. These local methods are practical and effective and can be part of bigger farming plans to help crops survive in increasing heat.

Farmers said that if they use shading and mulching, it will be better for the crop's productivity. Good seeds also play a crucial role in the harvest of crops. If you sow good seed, you definitely get a good harvest, but if you do not use good seeds, you may not experience a good harvest.

Sprays, pesticides, and a good irrigation system are key to the best productivity of crops because they protect the crops from damage and also help them in hotter weather.

Conclusion

In Chak Almas, tomatoes are struggling with higher temperatures, while okra is doing much better, even in hot weather. Tomatoes are especially weak during flowering, which reduces the harvest. Okra grows better in a hot climate and needs less care. So we can say that okra is a better heat-tolerant plant than tomatoes. Tomatoes start to burn if they are exposed to unfiltered sunlight. Good sprays and a good irrigation system are very beneficial for tomatoes to grow even in higher temperatures.

Farmers are using simple but helpful techniques like giving more water and good fertilizers. These steps are crucial to protect crops, especially tomatoes. As temperatures continue to rise, using heat-adapted crops and good farming practices will be even more fruitful. Adding good seeds and natural fertilizers works great for the crops and saves them from severe damage. The government needs to support the farmers by giving them money and training to adapt new methods and technologies to plant their crops even in higher temperatures.

Recommendations

1. Farmers should use timely irrigation and regular spraying to keep crops safe and healthy because regular watering can save crops from heat stress and make crops grow better in hot weather.
2. Shade nets or covers can save plants from the sun as they protect the crops from the direct sunlight, so this can help crops to avoid sunburn.
3. Thermotolerant seeds should be tried to lower the risk of crop failure because they are heat-tolerant and heat-friendly, so this will work well.
4. Government and organizations should train farmers and give them resources to cope with higher temperatures so that they can protect food and make it sustainable for the future.
5. More research is needed to generate and cultivate crops that grow well in hot climates because in our country, Pakistan, the summer season stays longer, so it is much needed.

References

Abdel-Fattah, G. M., et al. (2020). Delayed planting dates expose okra to heat stress, reducing pod set and yield. *Journal of Plant Physiology, 250*, 153377.
Google Scholar Worldcat Fulltext

Bin Khalid, M. F., et al. (2023). Salicylic acid improves growth, chlorophyll, photosynthesis, and biomass in okra under early heat stress. *Journal of Plant Growth Regulation, 42*(4), 1234–1245.
Google Scholar Worldcat Fulltext

Gunawardhana, M. D. M., & de Silva, C. S. (2021). Genetic variation for drought and heat tolerance in okra. *Journal of Agricultural Science, 162*(2), 202–213.
Google Scholar Worldcat Fulltext

Gunawardhana, M., & De Silva, C. (2012). Impact of temperature and water stress on growth, yield, and related biochemical parameters of okra. *Tropical Agricultural Research*, *23*(1), 77. https://doi.org/10.4038/tar.v23i1.4634
Google Scholar Worldcat Fulltext

Hayamanesh, S., Trethowan, R., Mahmood, T., Ahmad, N., & Keitel, C. (2023). Physiological and Molecular Screening of High Temperature Tolerance in Okra [Abelmoschus esculentus (L.) Moench]. *Horticulturae*, *9*(6), 722. https://doi.org/10.3390/horticulturae9060722
Google Scholar Worldcat Fulltext

Hazelton, S., & Muller, W. (2002). Plant responses to heat stress. In *Plant ecophysiology* (pp. 279–296). Springer.
Google Scholar Worldcat Fulltext

Hussain, S., et al. (2021). Exogenous proline alleviates heat stress in okra by improving growth, photosynthesis, and antioxidant enzymes. *Journal of Plant Physiology, 257*, 153388.
Google Scholar Worldcat Fulltext

Journal of Agricultural Science. (2014). Using heat-tolerant varieties, watering smarter, and mulching to improve crop resilience. *Journal of Agricultural Science*.
Google Scholar Worldcat Fulltext

Kumar, P., et al. (2020). Impact of heat stress on plant growth and productivity. *Journal of Environmental Biology, 41*(3), 537–545.
Google Scholar Worldcat Fulltext

M. S. H., et al. (2022). Evaluation of tomato cultivars for heat tolerance. *Journal of Agricultural Science, 160*(1), 134–143.
Google Scholar Worldcat Fulltext

Mukhtar, T., et al. (2020). *Bacillus cereus* inoculation alleviates heat stress in tomato by improving biochemical profiles. *Journal of Plant Interactions, 15*(1), 234–243.
Google Scholar Worldcat Fulltext

Ouonkap, S. V. Y., Palaniappan, M., Pryze, K., Jong, E., Ali, M. F., Styler, B., Almasaud, R. A., Harkey, A. F., Reid, R. W., Loraine, A. E., Smith, S. E., Muday, G. K., Pease, J. B., Palanivelu, R., & Johnson, M. A. (2024). Enhanced pollen tube performance at high temperature contributes to thermotolerant fruit production in tomato. *bioRxiv: the preprint server for biology*, 2024.08.01.606234. https://doi.org/10.1101/2024.08.01.606234
Google Scholar Worldcat Fulltext

Sato, S., et al. (2000). Heat stress affects fruit set and development in tomato. *Journal of the American Society for Horticultural Science, 125*(4), 455–460.
Google Scholar Worldcat Fulltext

Siemonsma, J. S., & Kouame, C. (2004). Okra. In *Vegetables* (pp. 529–536). Springer.
Google Scholar Worldcat Fulltext

Udeagbala, V. C., et al. (2023). Impact of rising mean temperatures on okra and tomato yields in Nigeria. *Journal of Agricultural Science, 161*(4), 542–553.
Google Scholar Worldcat Fulltext

Utobo, E. B., et al. (2022). Effects of heat stress on okra fruit quality. *Journal of Food Science and Technology, 59*(2), 638–646.
Google Scholar Worldcat Fulltext

Wahid, A., Gelani, S., Ashraf, M., & Foolad, M. (2007). Heat tolerance in plants: An overview. *Environmental and Experimental Botany*, *61*(3), 199–223. https://doi.org/10.1016/j.envexpbot.2007.05.011
Google Scholar Worldcat Fulltext