Problem Chosen	2025	Team Control Number
E	**MCM/ICM** **Summary Sheet**	**2511940**

Our Article

Summary

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2 Assumptions and Notations

2.1 Assumptions and Explanations

- **Accurate Data Assumption**: The model assumes that the data used are accurate.
  Explanation: The data used in the model are sourced from official databases, and we believe the data to be accurate and reliable.

- **Geographic Applicability Assumption**: The model assumes that the applicable region is Southeast Asia, where two crops of rice are planted each year in the farmland.
  Explanation: The climate of Southeast Asia is rather simple, with only two seasons-rainy and dry. Additionally, as is shown in Figure 3, the temperature variation within a year is minimal,which has a trivial effect on the ecosystem. Consequently,temperature can be considered as a constant. Due to such weather pattern,it aligns with the planting patterns commonly observed in Southeast Asia to plant two crops of rice each year, and the simplicity of crop types makes the model easier to establish.
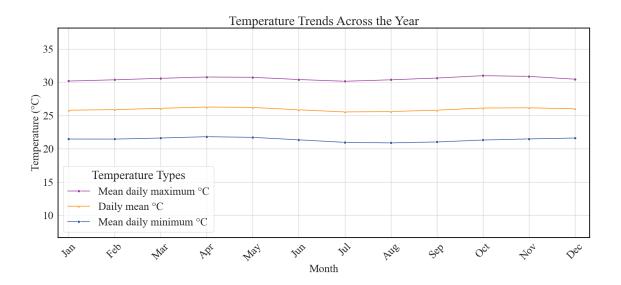
Figure 3: Mean Temperature from 1991 to 2020 in Southeast Asia

- **Stable Trait Assumption**: The model assumes that the traits of all organisms remain stable..
  Explanation:Since the time span considered in the model is much shorter than the time required for evolutionary changes or mutations to occur, the traits of organisms are assumed to remain stable. This assumption also helps simplify the model.

- **Stable Lighting Conditions Assumption**: The model assumes that the region under study experiences stable lighting conditions throughout the four seasons.
  Explanation: Since the model focuses on tropical regions, the variation in daylight duration across different months within a year is minimal, thus the lighting conditions are treated as constant in the model.

- **Stable Growth Environment Assumption**: The model assumes that no natural disasters, which could significantly impact the agricultural ecosystem, will occur during the time frame considered.
  Explanation: Natural disasters are considered low-probability events in agricultural activities. To ensure the generalizability of the model, natural disasters should not be considered.

2.2   Notations

Symbols	Description
$\mathbf{X}$	Vector $[N_w, N_c, N_p, N_b, N_B, C_{hc}, C_{pc}]^T$ to describe the system,etc.
wd	Subscription for weeds
crp	Subscription for crops
pst	Subscription for pest(who consumes crops)
ins	Subscription for other insects(who consume weeds)
bd	Subscription for small birds(herbivorous)
Bd	Subscription for huge birds(carnivorous)
bt	Subscription for bats
snk	Subscription for snake
frg	Subscription for frog
HC	Subscription for herbicide
PC	Subscription for pesticide
C_i	Concentration of certain chemical
N_i	Numbers of certain species
W_i	Biomass of certain species
w_i	Mass of individuals
r_i	Natural growth gate of certain species
K_i	Carrying capacity of certain species
α	The effect of chemical concentration on growth rate
β	Interspecific competition factor
γ	Activity of decomposer

3   Application of the Models

4   Sensitivity Analysis

5   Evaluation of the Model

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6   Conclusion

References

[1] John Doe. An example article. *Journal of Examples*, 1:1–10, 2020.

[2] Rosenow D.T. et al. Drought tolerant sorghum and cotton germplasm. *Agricultural Water Management*, 7(1):207–222, 1983.