

# An Agent-Based Model for Surveillance of Dengue in Sub-Saharan Africa: A Case of Tanzania

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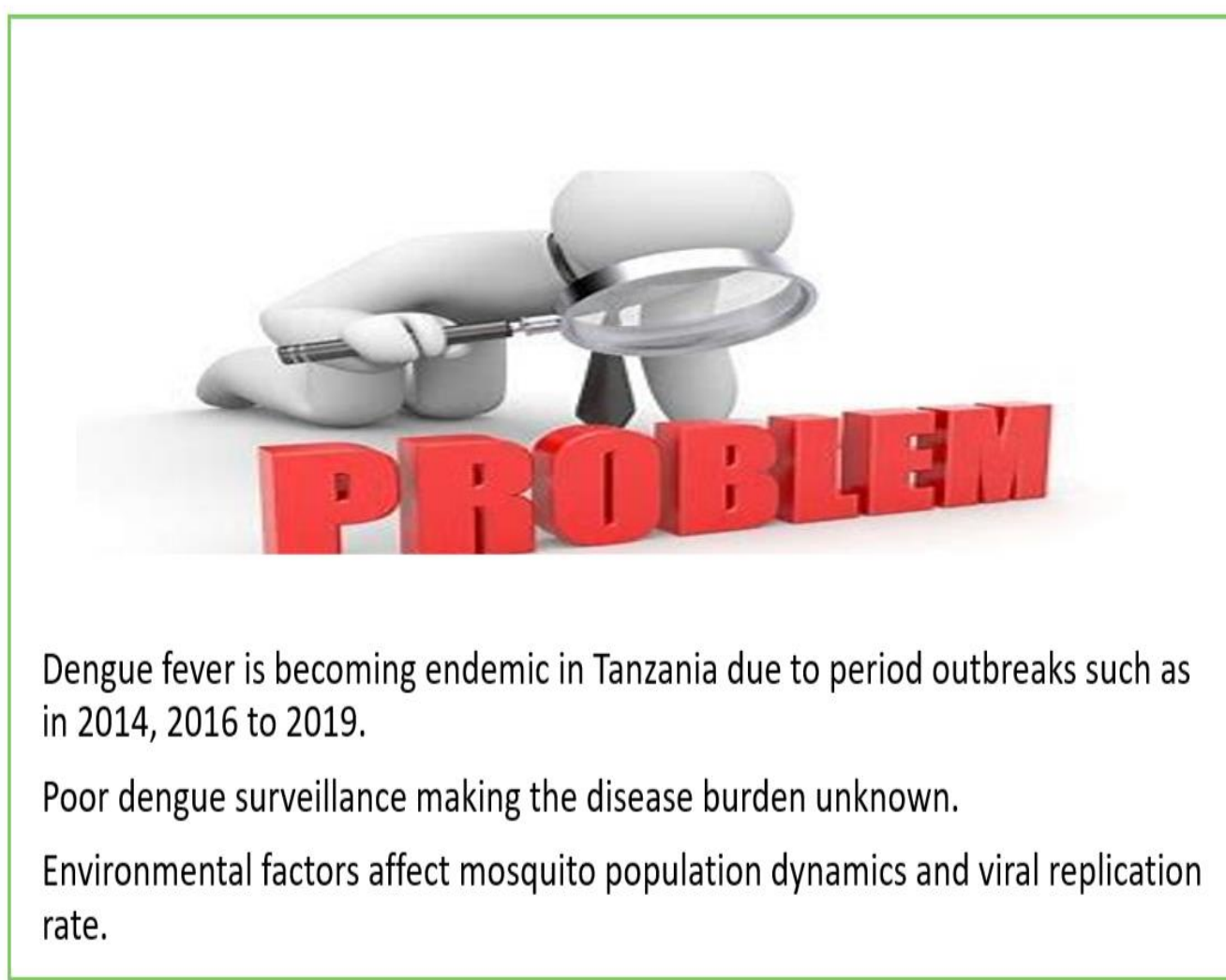
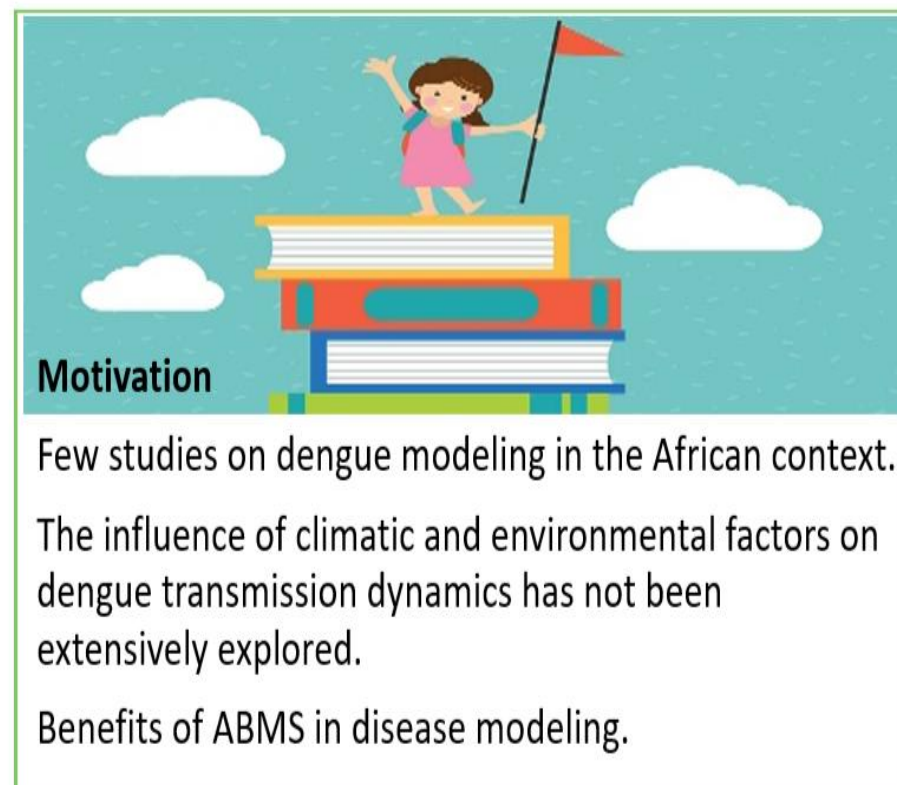
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DEEP LEARNING  
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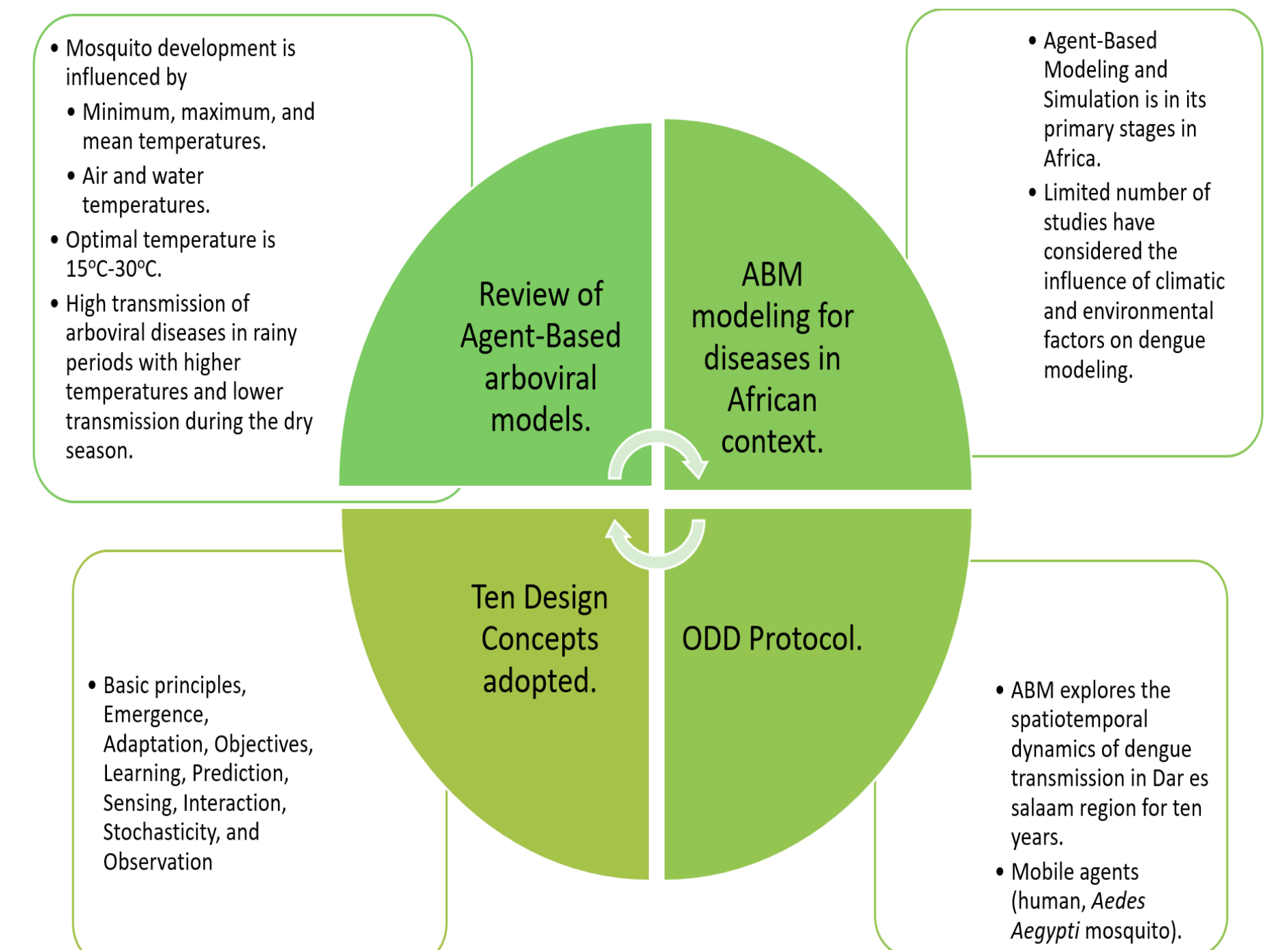
## 1. Motivation and Objectives



## 2. Quantitative Research Methods

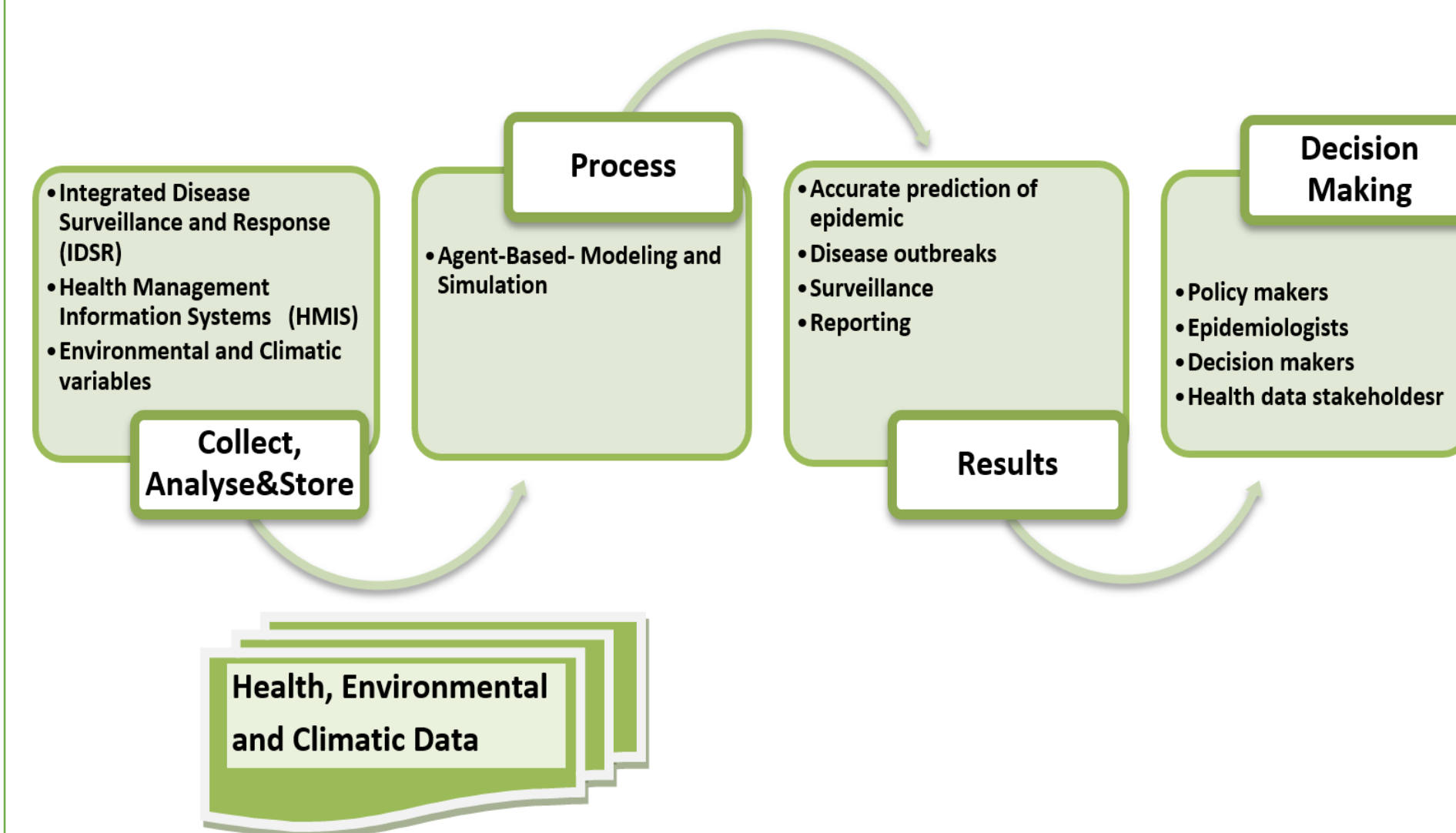


## 3. Preliminary Results

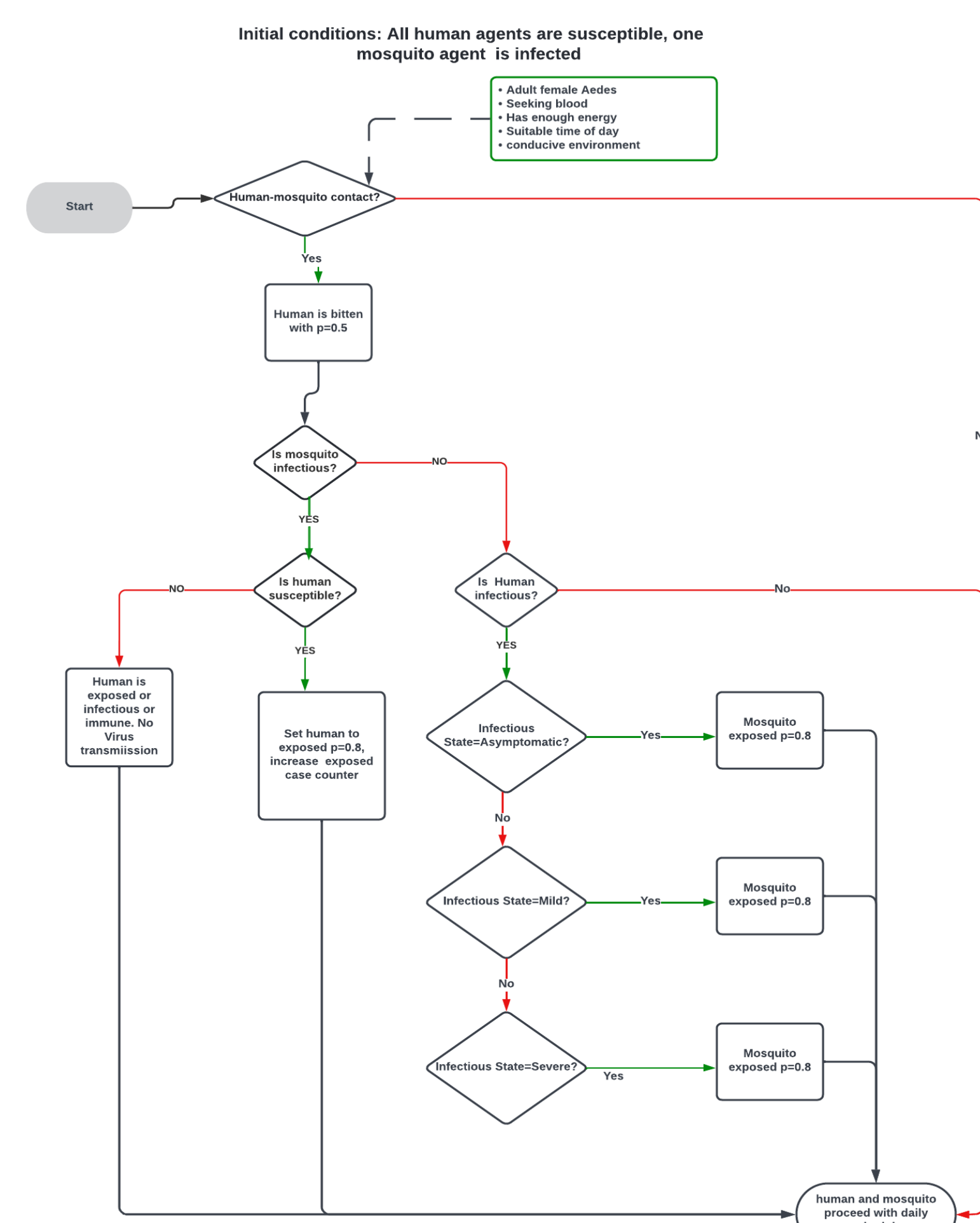


## Agent-Based Model and Simulation

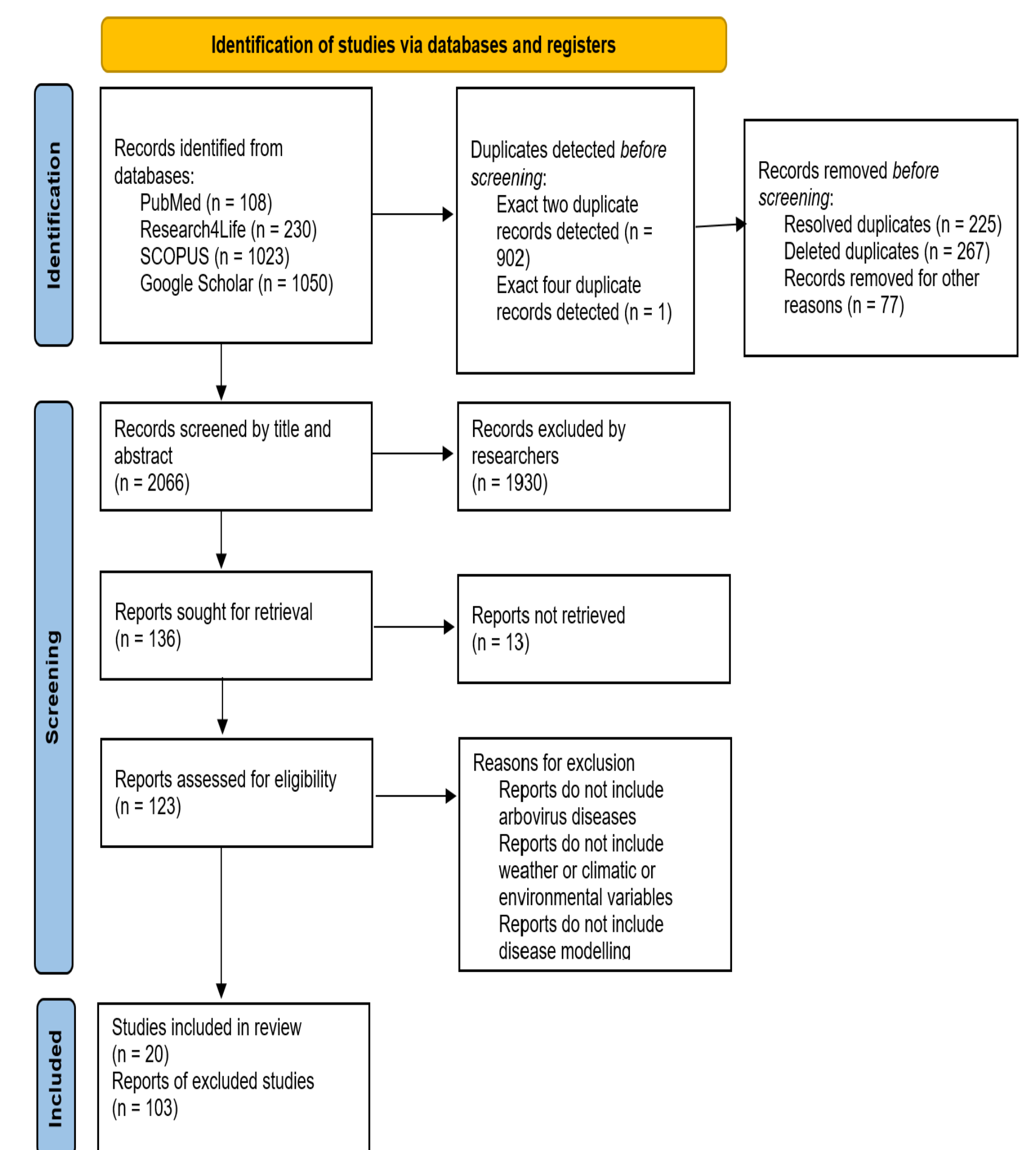
### Dengue agent-based model



### Flow chart diagram for dengue transmission between humans and mosquito vector



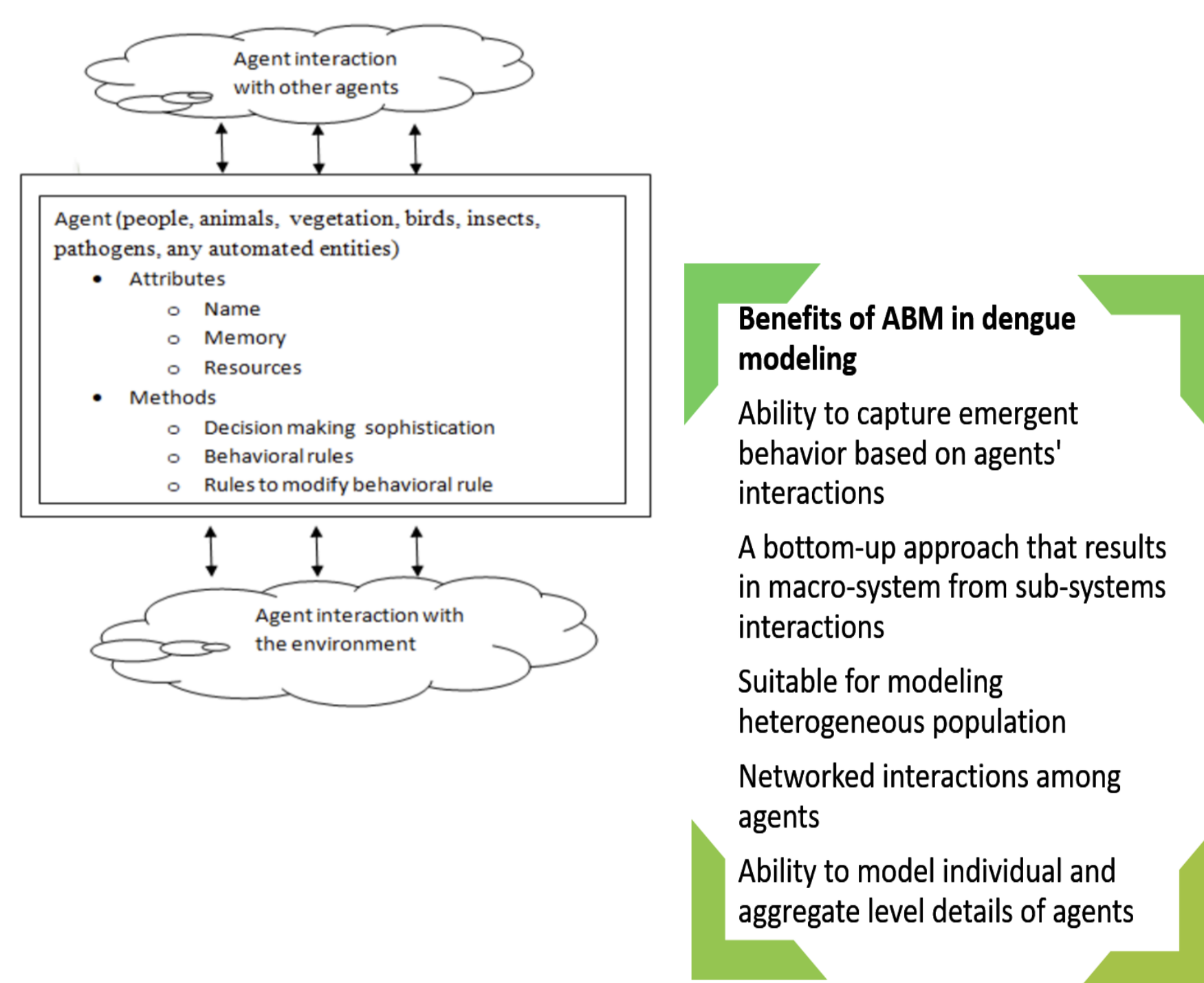
### Prisma Diagram showing results from four databases search on agent-based modeling for arboviruses and climatic factors



#### References

- [1] S. L. Chang, M. Piraveenan, P. Pattison, and M. Prokopenko, "Game theoretic modelling of infectious disease dynamics and intervention methods: a review," *J. Biol. Dyn.*, vol. 14, no. 1, pp. 57–89, 2020, doi: 10.1080/17513758.2020.1720322.
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- [3] C. M. Macal and M. J. North, "Agent-based modeling and simulation," in *2009 Winter Simulation Conference*, 2009, pp. 86–98, doi: 10.1109/WSC.2009.5429318.
- [4] World Health Organization, "Surveillance and control of arboviral diseases in the WHO African Region: assessment of country capacities," 2022.
- [5] WHO, "Dengue and severe dengue," *World Health Organization*, 2023. <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue> (accessed Mar. 24, 2023).
- [6] I. Mahmood, M. Jahan, D. Groen, A. Javed, and F. Shafait, *An agent-based simulation of the spread of dengue fever*, vol. 12139 LNCS. Springer International Publishing, 2020, doi: 10.1007/978-3-030-50420-5\_8.
- [7] L. Pascoe, T. Clemen, K. Bradshaw, and D. Nyambo, "Review of Importance of Weather and Environmental Variables in Agent-Based Arbovirus Models," *Int. J. Environ. Res. Public Health*, vol. 19, no. 23, 2022, doi: 10.3390/ijerph192315578.

## Why Agent-Based Modeling?

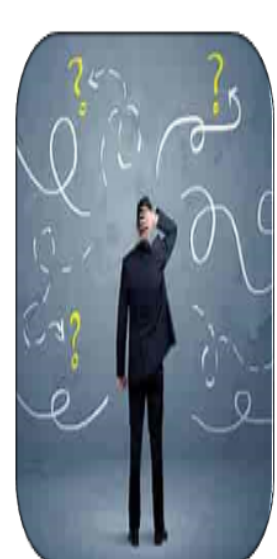


An agent and its elements

## Theories



**Game theory:** Modeling strategic interaction between two or more players in a situation containing set rules and outcomes



**Decision making theory:** Governs how rational individuals should behave under risk and uncertainty. Agents make decisions during their interactions.