

A Computer Vision Tomato Pest Assessment and Prediction Tool

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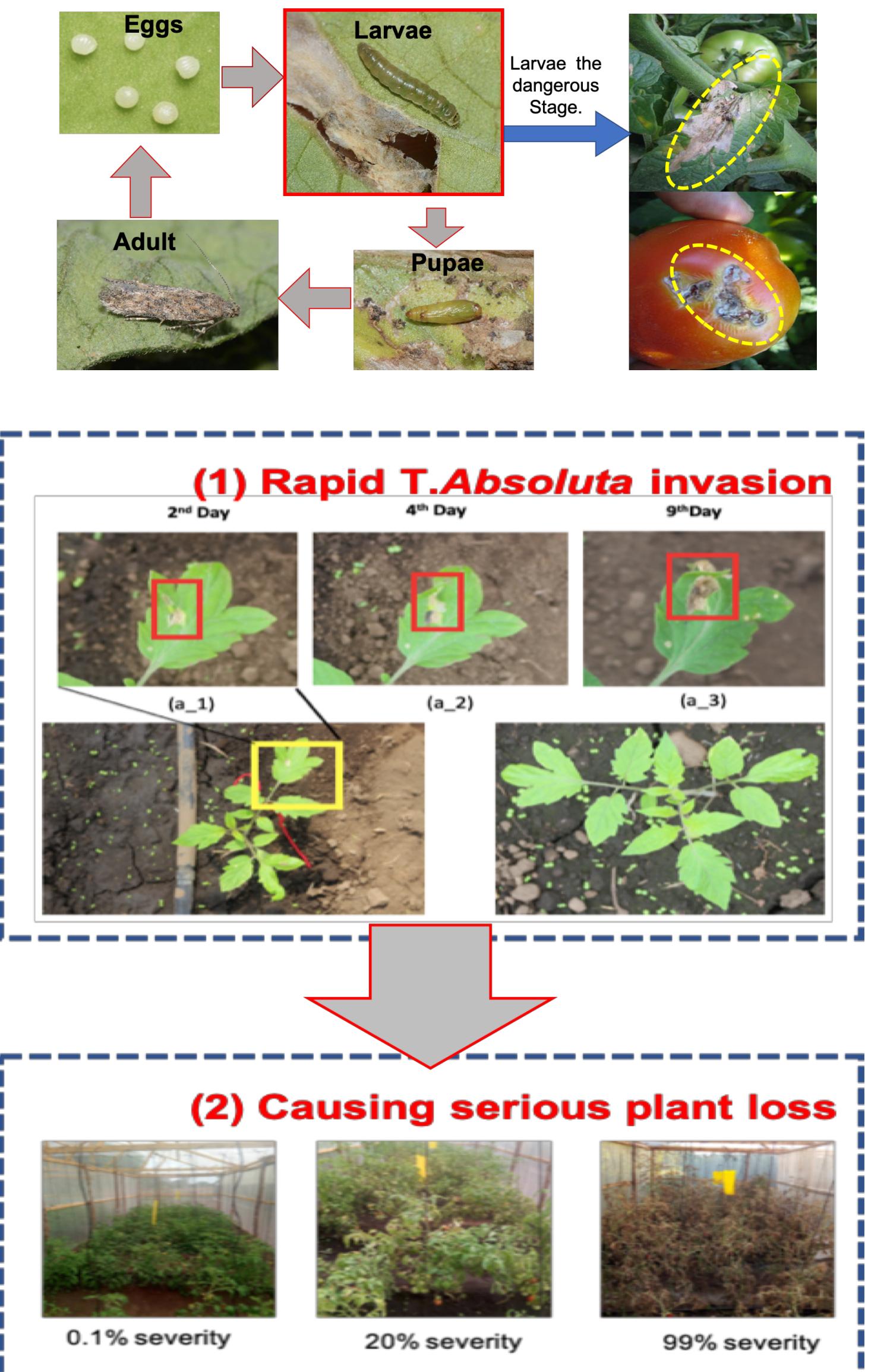
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Background

Tomato considered a high value crop and income resource for poor growers (FAO, 2012)

But ***Tuta absoluta*** is devastating tomato yield causing **loss** of up to **100%** jeopardizing livelihoods of millions



Important to understand **crop stress** for crop production (food security and poverty alleviation) (Smucker et al, 2015)

Current strategy

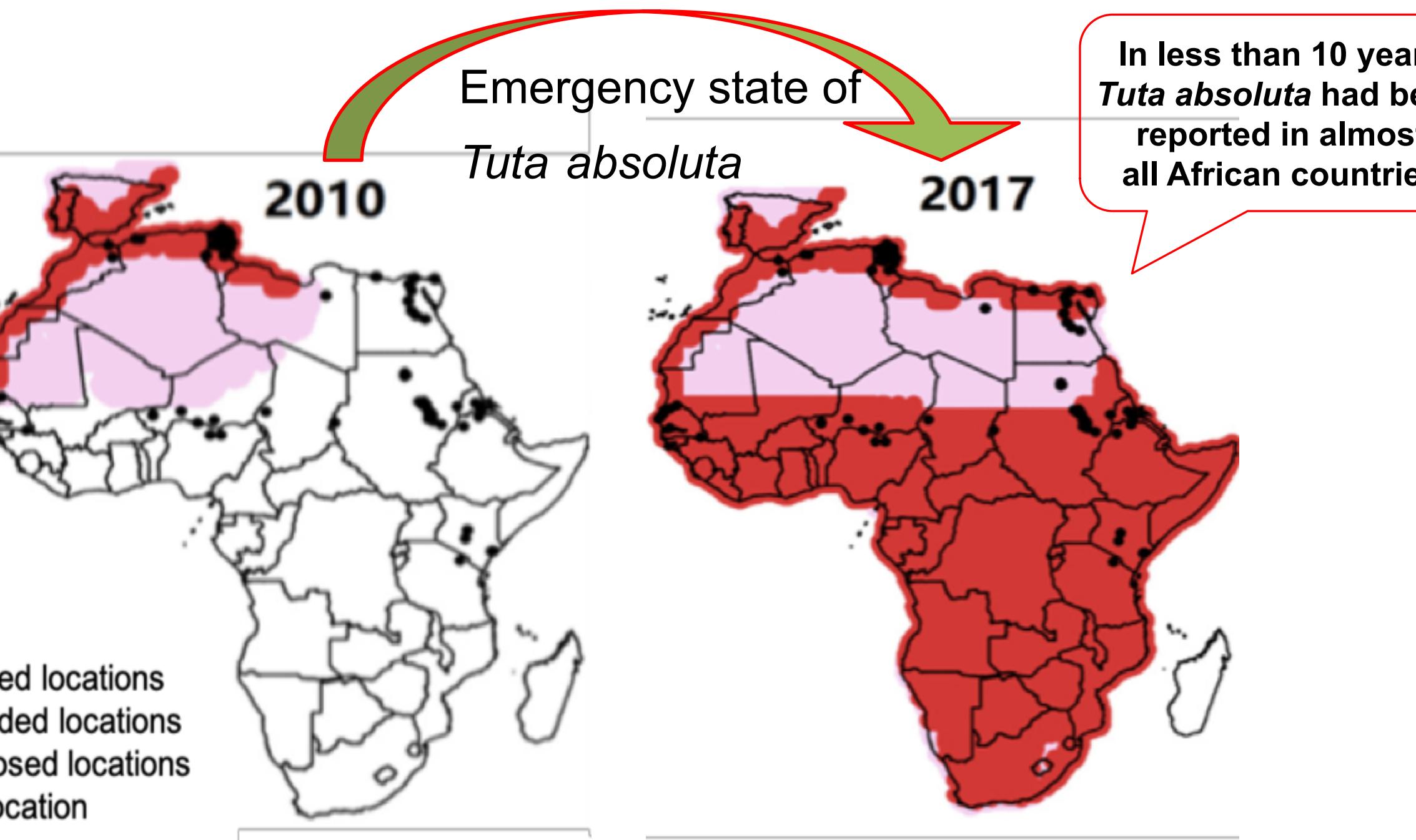
- **High cost** pesticide use
- **Development** of resistant tomato varieties
- Application of biological control
- Pheromone traps for monitoring population and presence detection

⌚ **Above** are low-speed inefficient manual identification

Also limited number of agriculture extension officers service

🏃 Therefore, A fast Early detection Computer Vision solution for *T. absoluta* case is required

Why it matters?

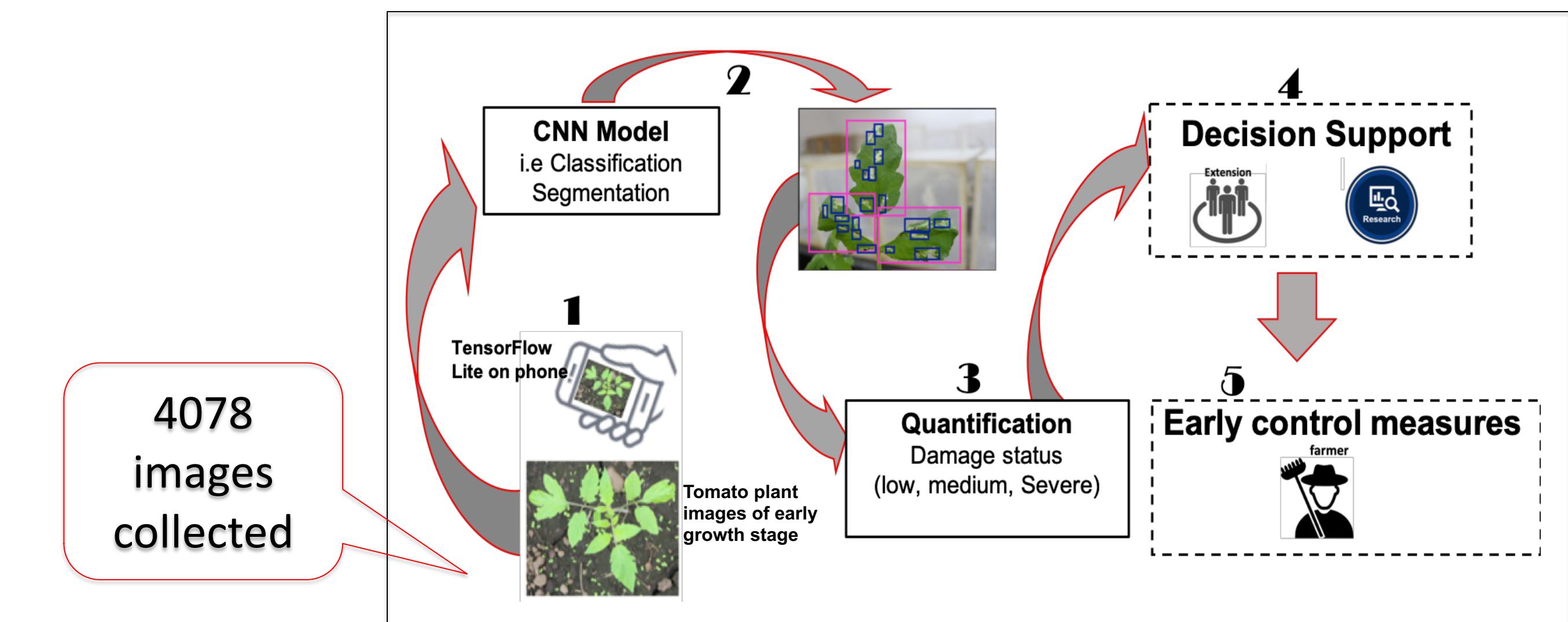


CLIMEX climatic suitability indices for *Tuta absoluta* in Africa. Predictions are based on the eco-climatic index (EI). **Source; Henri et al.,(2015)**

Solution

Using Computer Vision:

For top 20 tomato producers in Africa
a 50% loss (10000 KT) reduction would **save \$7 Billion**



Limitations:

- Image data was collected from Arusha region –Tanzania. More data from other regions of Tanzania and Sub-Saharan Africa is required.
- More data will be added to database through **developed mobile App**.

Future work

- We would extend the system to other invasive crop pests.
- Collected multispectral images will be used to develop **Vegetation indices** for *Tuta absoluta* invaded crop farms.

Reference:

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- [3] He, K., Gkioxari, G., Dollár, P., & Girshick, R. (2017). Mask r-cnn. In *Proceedings of the IEEE international conference on computer vision* (pp. 2961-2969).
- [4] Krizhevsky, A., Sutskever, I., Hinton, G.: ImageNet classification with deep convolutional neural networks. In: *Advances in Neural Information Processing Systems*, vol. 25, pp. 1097–1105 (2012)
- [5] Smucker, Thomas A., et al. "Differentiated livelihoods, local institutions, and the adaptation imperative: Assessing climate change adaptation policy in Tanzania." *Geoforum* 59 (2015): 39-50..