

Field margin vegetation mapping using satellite images and deep learning models in a tropical landscape

Background & Objective

Field Margin Vegetation (FMV) refers to the strips of land between crops (includes hedgerows, fencerows, green lane etc.) and field boundaries (Reberg-Horton et al., 2010).

- ❖ Herbs, shrubs, trees and any type of grassland.
- ❖ Enhancing landscape resilience, maintaining ecological integrity and ecosystem services.
- ❖ Mapping is complex and expensive.

Objective: To comprehensively demonstrate the application of semantic segmentation techniques for FMV mapping.



Fig. 1: FMV areas in Bengaluru

Approach

- ❖ Study area: Bengaluru, India.
- ❖ Satellite data: Worldview 3 (8 bands, 1.24 m spatial resolution).

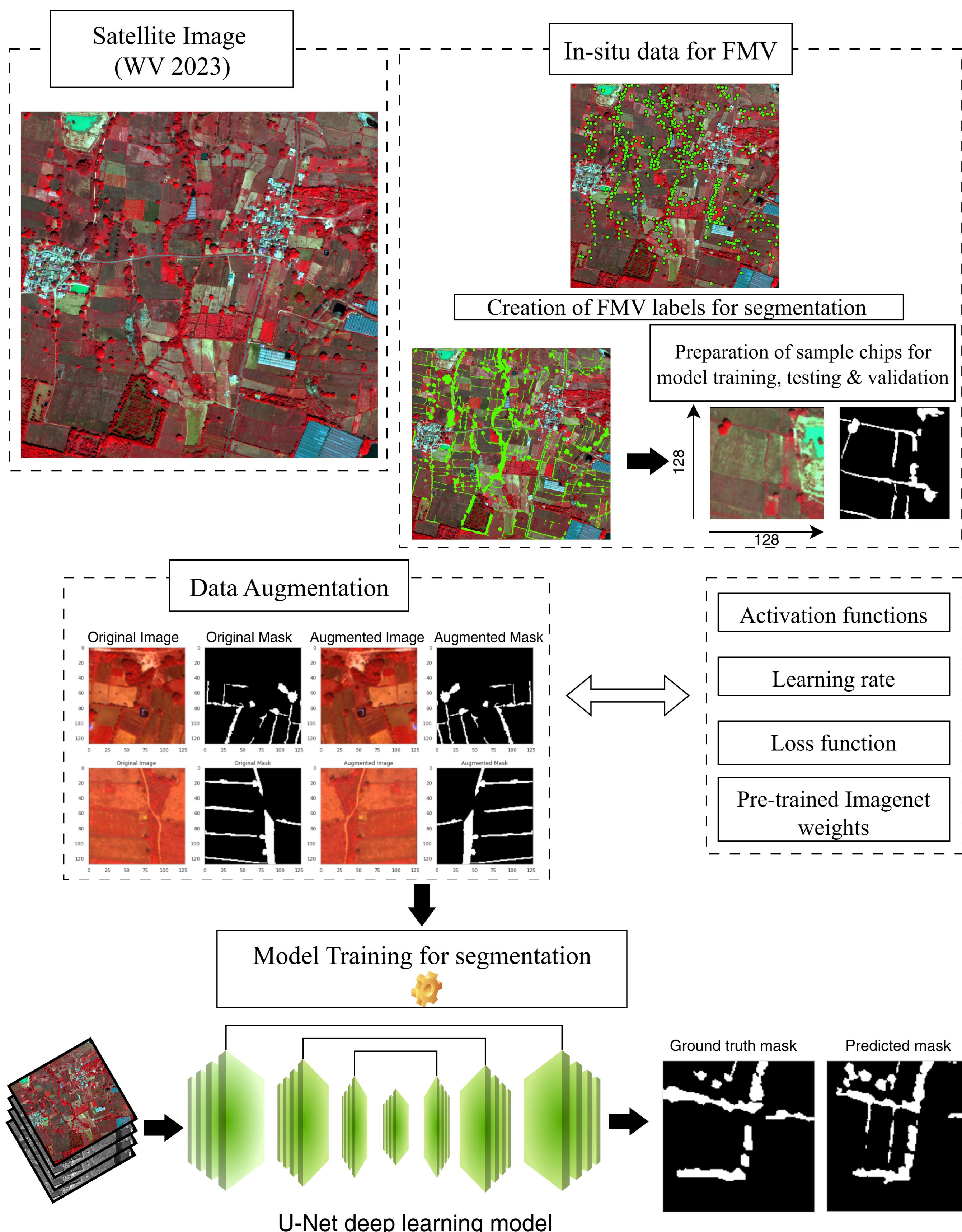


Fig. 2: Flow chart of the methodology

Results

Table 1: Model performances summary

Band Combination	Binary Accuracy	F1 Score
Red + Green + Blue	0.95	0.49
Red Edge + Near Infrared + Yellow	0.95	0.50
Red Edge + Red + Yellow	0.95	0.51
Red Edge + Yellow + Coastal Blue	0.96	0.58
Near Infrared + Red + Green	0.94	0.51
Near Infrared + Red + Green + Blue	0.95	0.49
Normalised Difference Vegetation Index	0.95	0.34

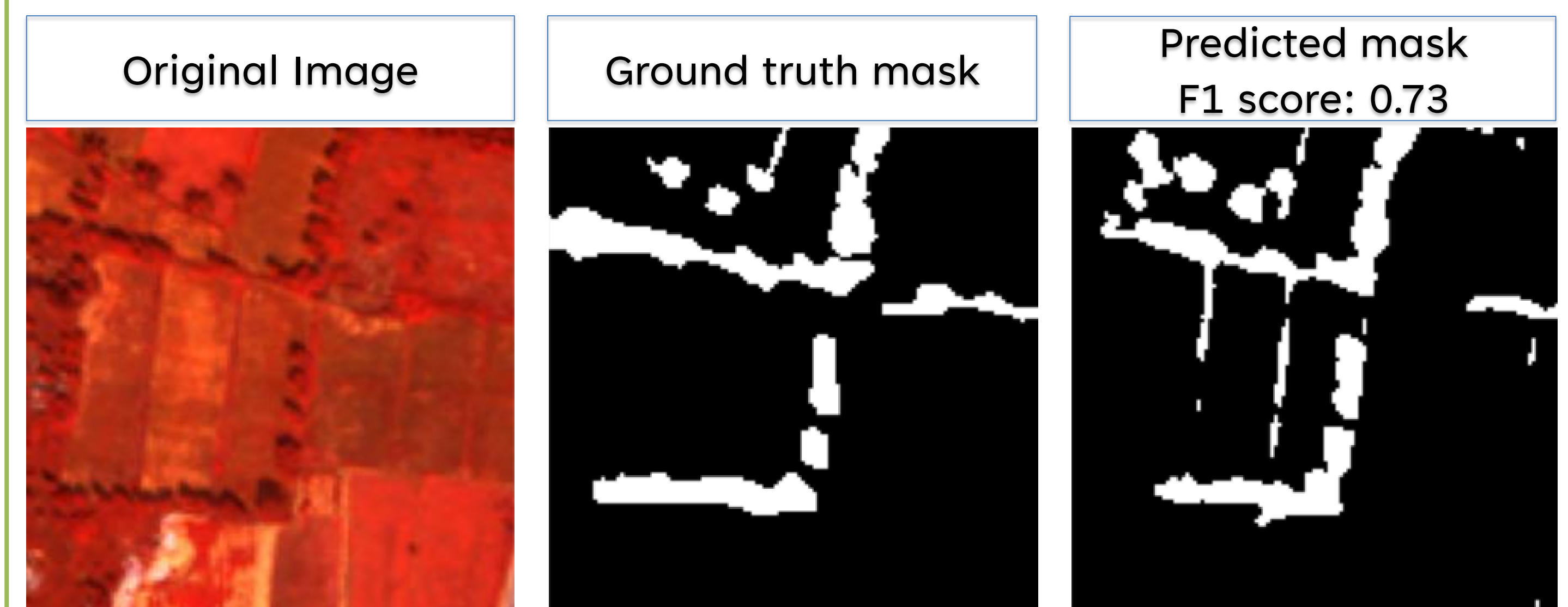


Fig. 3: Ground truth vs predicted

Highlights

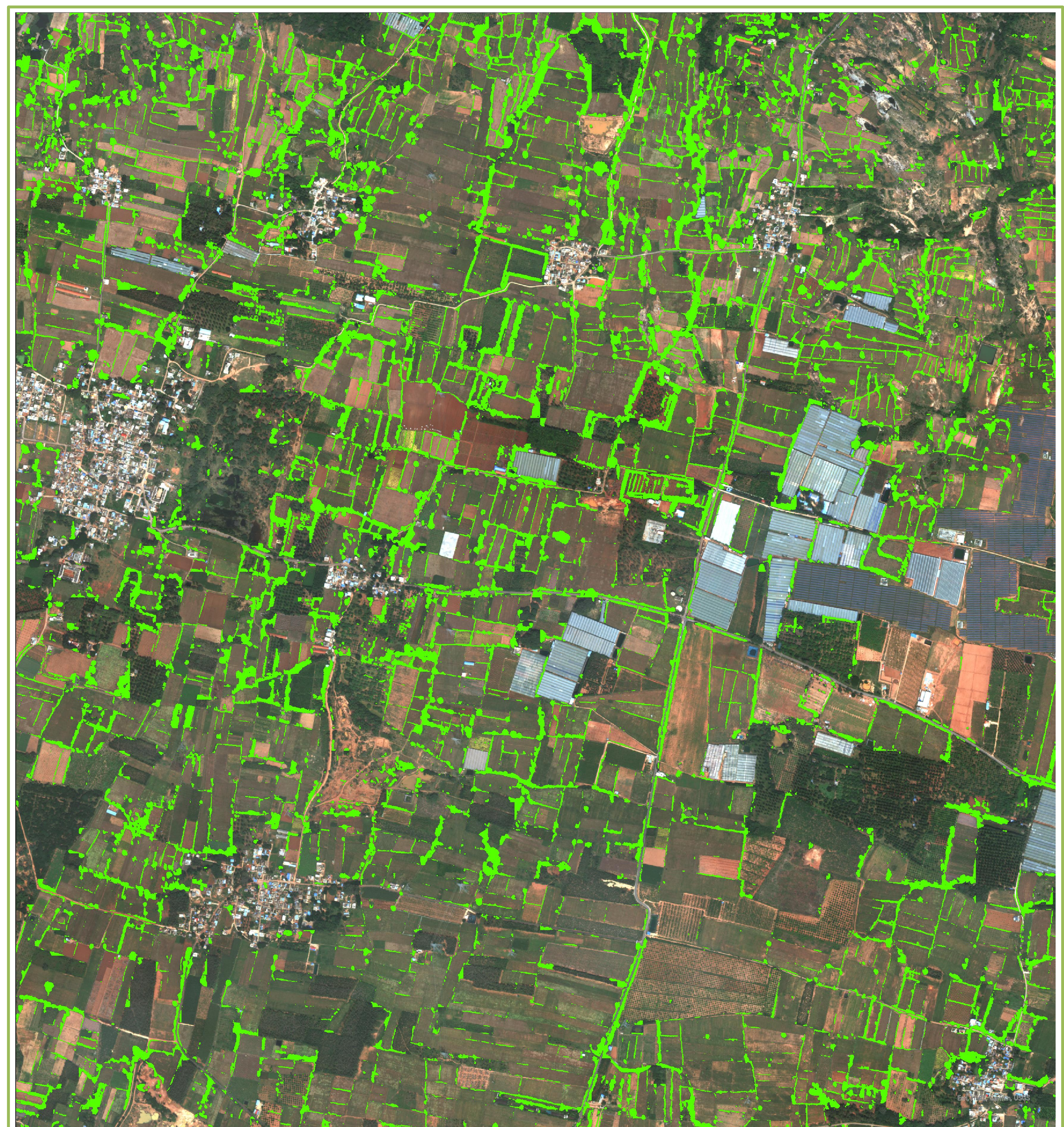


Fig. 4: Predicted FMV

- ❖ A heterogeneous agricultural landscape provides more benefits than larger cropland areas.
- ❖ Policies should encourage more FMV, as well as its equitable distribution across landscapes.
- ❖ Our next research focuses on classification of FMV.

Reberg-Horton, S.C., Mueller, J.P., Mollage, S.J., Creamer, N.G., Brownie, C., Bell, M. and Burton, M.G., 2011. Influence of field margin type on weed species richness and abundance in conventional crop fields. *Renewable Agriculture and Food Systems*, 26(2), pp.127-136.



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