

# Patterns and Drivers of Medium-Term Agricultural Landscape Transformation in Kyunsu Township, Southern Myanmar

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## Introduction

- In Kyunsu township of southern Myanmar (Fig.1), agricultural lands are expanding into natural forests causing losses of resources which are vital for ecosystem services.
- Understanding of patterns of agricultural landscape transformation allows local policy makers to foster ecologically sound crop production.
- Our study aimed at investigating agricultural landscape transformation and land use and land cover (LULC) changes in Kyunsu township over 40 years.

## Materials and Methods

- A hybrid classification approach was used for Landsat and secondary datasets of 1978, 1989, 2000, 2011, and 2020.
- Nine LULC classes were differentiated using multiple classification methods: iso-cluster unsupervised classification, supervised random forest classification, referral and reclassification of classified data, and digitisation with ArcGIS software and the GEE platform.
- Accuracies of the classified datasets were assessed with the confusion matrix of 900 random sample points generated by applying equalized stratified random sampling strategy in ArcGIS.

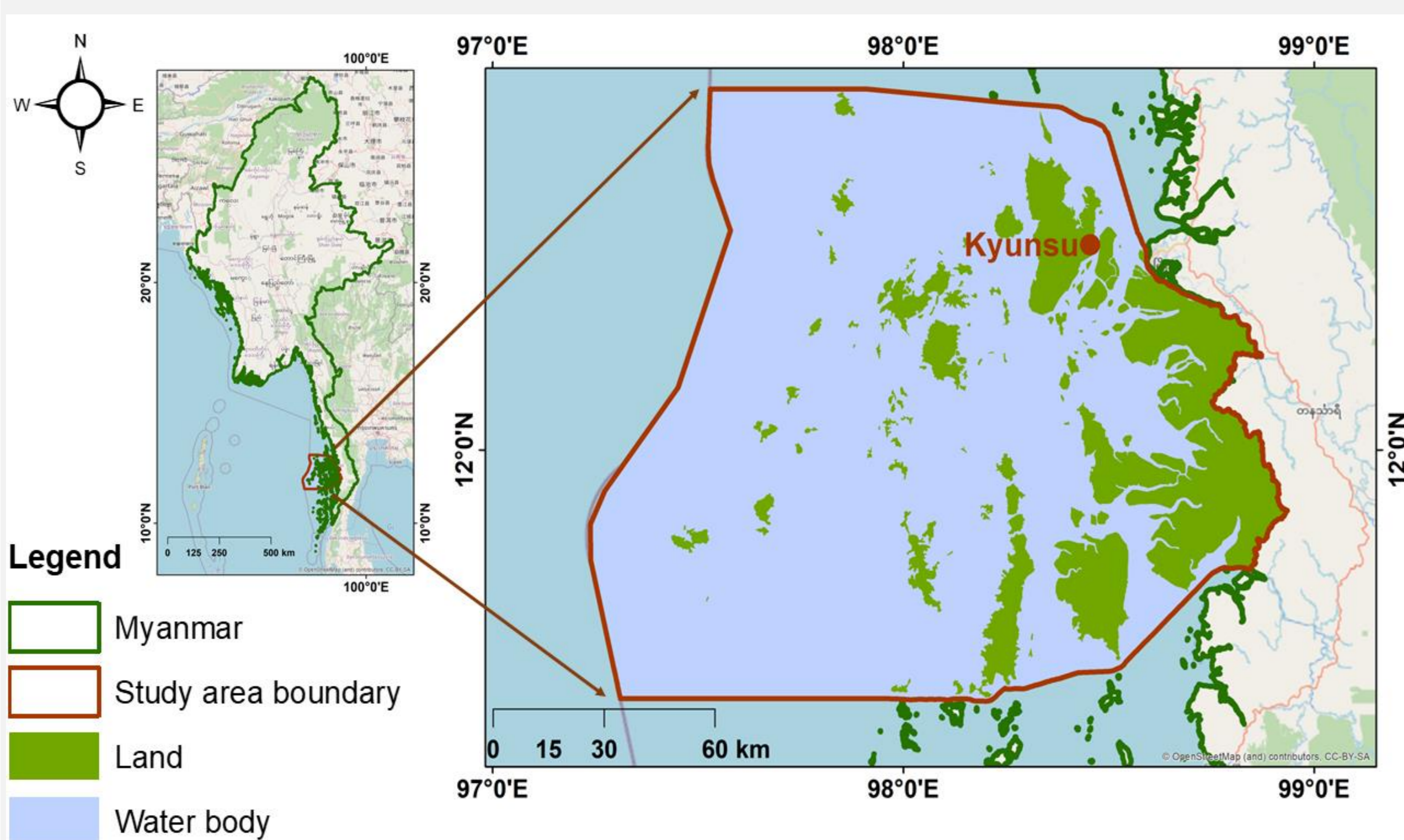


Figure 1. Map of the study area, Kyunsu township of southern Myanmar.

## Discussion

- Integration of four rather than one classification method allowed accurate classification.
- Expansion of subsistence and large-scale commercial agricultural lands as a consequence of increasing population was one of the major causes of natural forest losses in Kyunsu township.

## Results

- Overall accuracies of classified datasets for 1978, 1989, 2000, 2011, and 2020 were 96 - 97%. The results showed growth of settlement areas (115%), expansion of lowland rice fields (90%), enlargement of open forest areas (81%), shrinkage of closed forests (45%), improvement of aquaculture (1,594%), expansion of other LULC classes (188%), increasement of water body (0.11%), reduction of mangrove forests (9%), and expansion of plantation areas (11%).
- 55 km<sup>2</sup> (85%) of lowland rice areas expanded into open forests, mangrove forests, and plantation areas (Fig. 2).

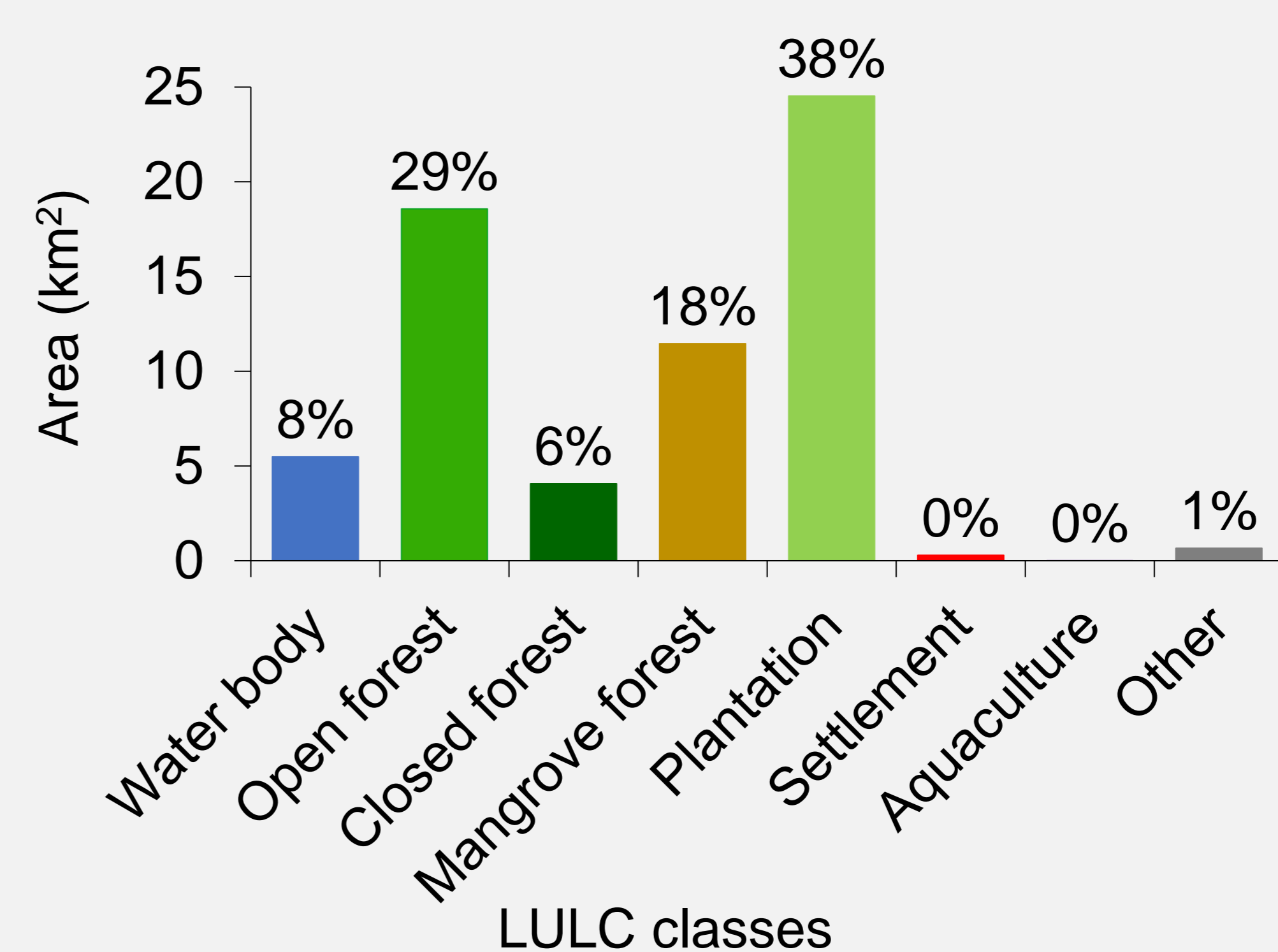


Figure 2. Expansion of lowland rice fields into other land use and land cover classes in Kyunsu township of southern Myanmar from 1978 to 2020.

- 229 km<sup>2</sup> (95%) of open forests, closed forests, and mangrove forests changed into plantation areas (Fig. 3).

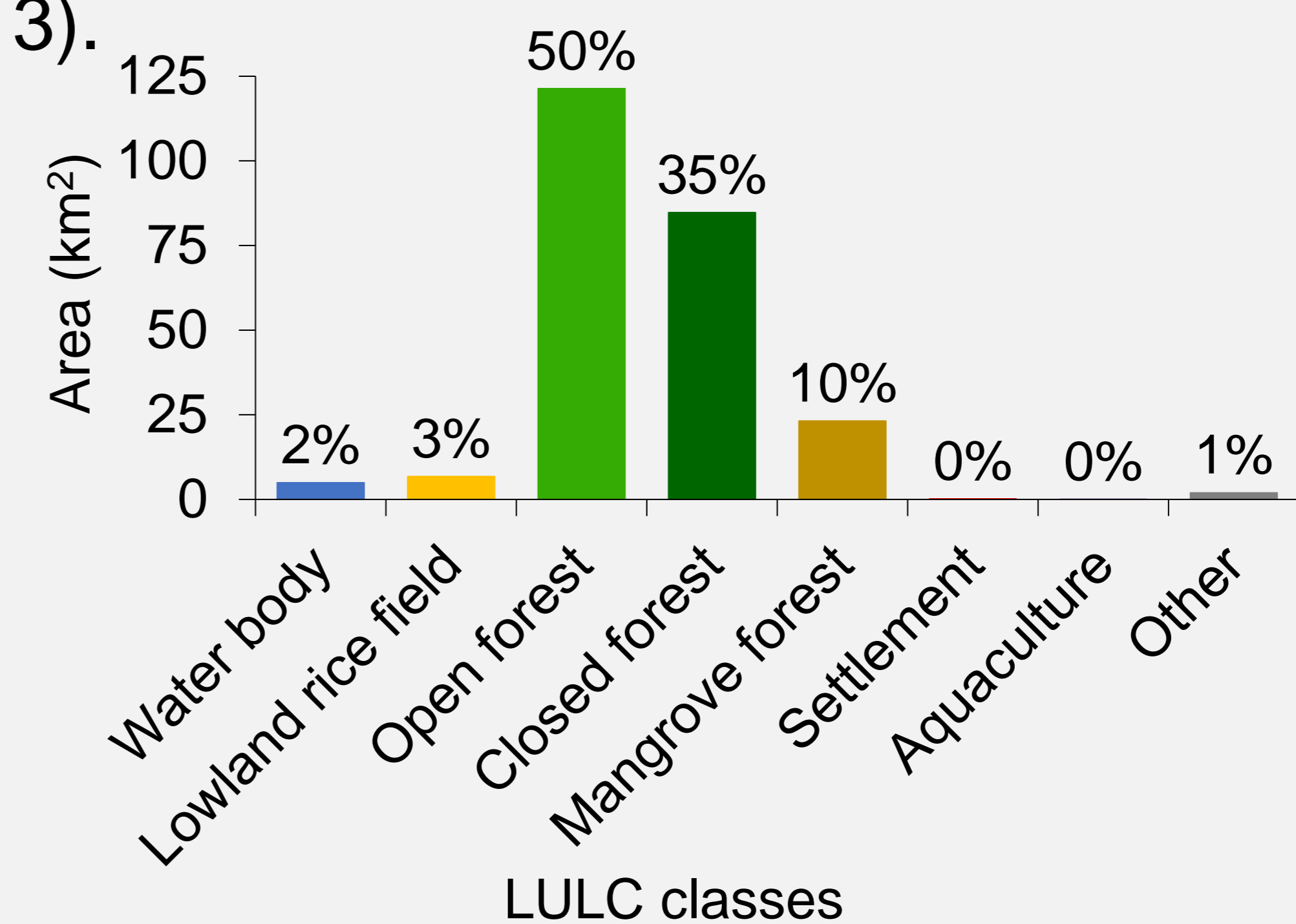


Figure 3. Expansion of plantation areas into other land use and land cover classes in Kyunsu township of southern Myanmar from 1978 to 2020.

## Conclusion

Local agricultural extension services and land-use policy makers should foster agroecological cropping practices to improve crop productivity per unit land area for enhanced livelihood security of the local crop producers while maintaining natural forests for ecosystem services.

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