SUPPLEMENTARY MATERIAL

Modelling causality between agricultural and meteorological drought indices in the Corong River basin, East Java Indonesia

Nur A. Affandy[1,5] ✉ iD, Data Iranata[1] iD, Nadjadji Anwar[1], Mahendra A. Maulana[1] iD,
Dedy D. Prastyo[2] iD, Lalu M. Jaelani[3] iD, F.X. Suryadi[4] iD

[1] Institut Teknologi Sepuluh Nopember, Faculty of Civil, Planning, and Geo Engineering, Department of Civil Engineering, ITS Civil Engineering Department, ITS Sukolilo Campus, Surabaya 60111, Indonesia
[2] Institut Teknologi Sepuluh Nopember, Faculty of Science and Data Analytics, Department of Statistics, Surabaya, Indonesia
[3] Institut Teknologi Sepuluh Nopember, Faculty of Civil, Planning, and Geo Engineering, Department of Civil Engineering, Department of Geomatics Engineering, Surabaya, Indonesia
[4] IHE Delft, Institute for Water Education, Delft, The Netherlands
[5] Universitas Islam Lamongan, Faculty of Engineering, Department of Civil Engineering, Indonesia
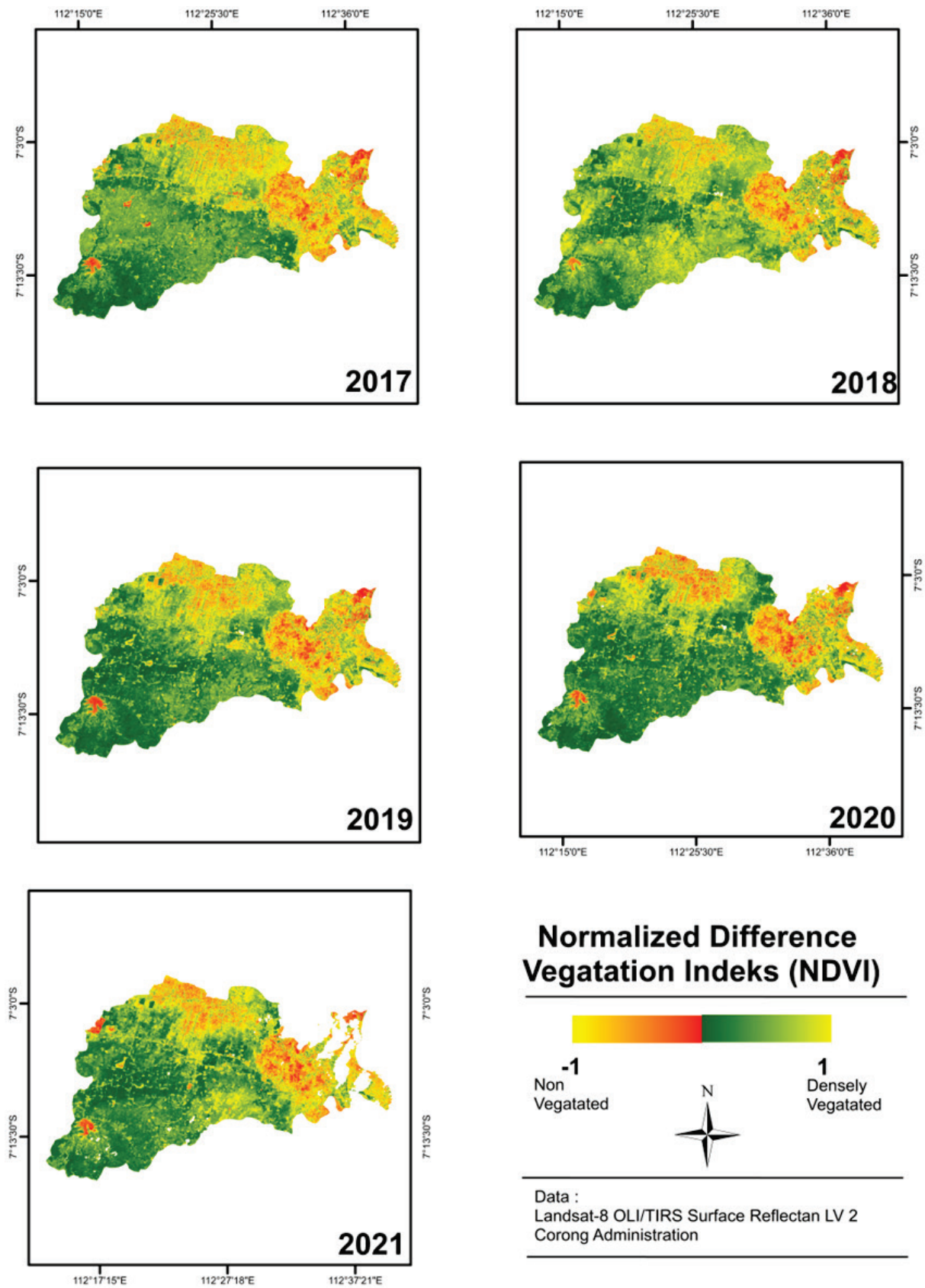
Fig. S1. *NDVI* map of the Corong River Basin for 2017–2021; source: own study
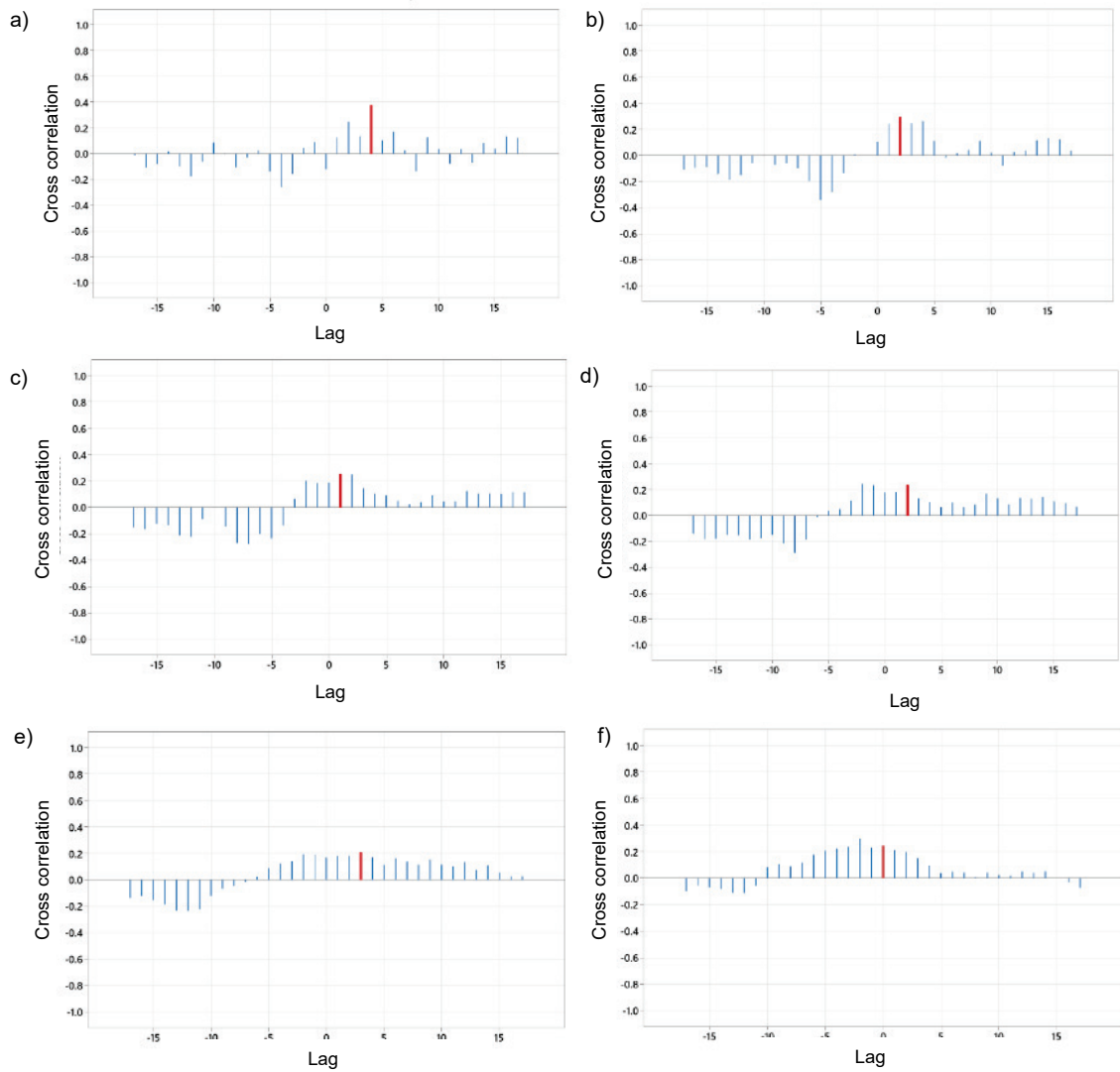
Fig. S2. Cross-correlation between standardized precipitation evapotranspiration index (*SPEI*) and normalized difference vegetation index (*NDVI*): a) *SPEI*-1, b) *SPEI*-3, c) *SPEI*-6, d) *SPEI*-9, e) *SPEI*-12, f) *SPEI*-24; source: own study
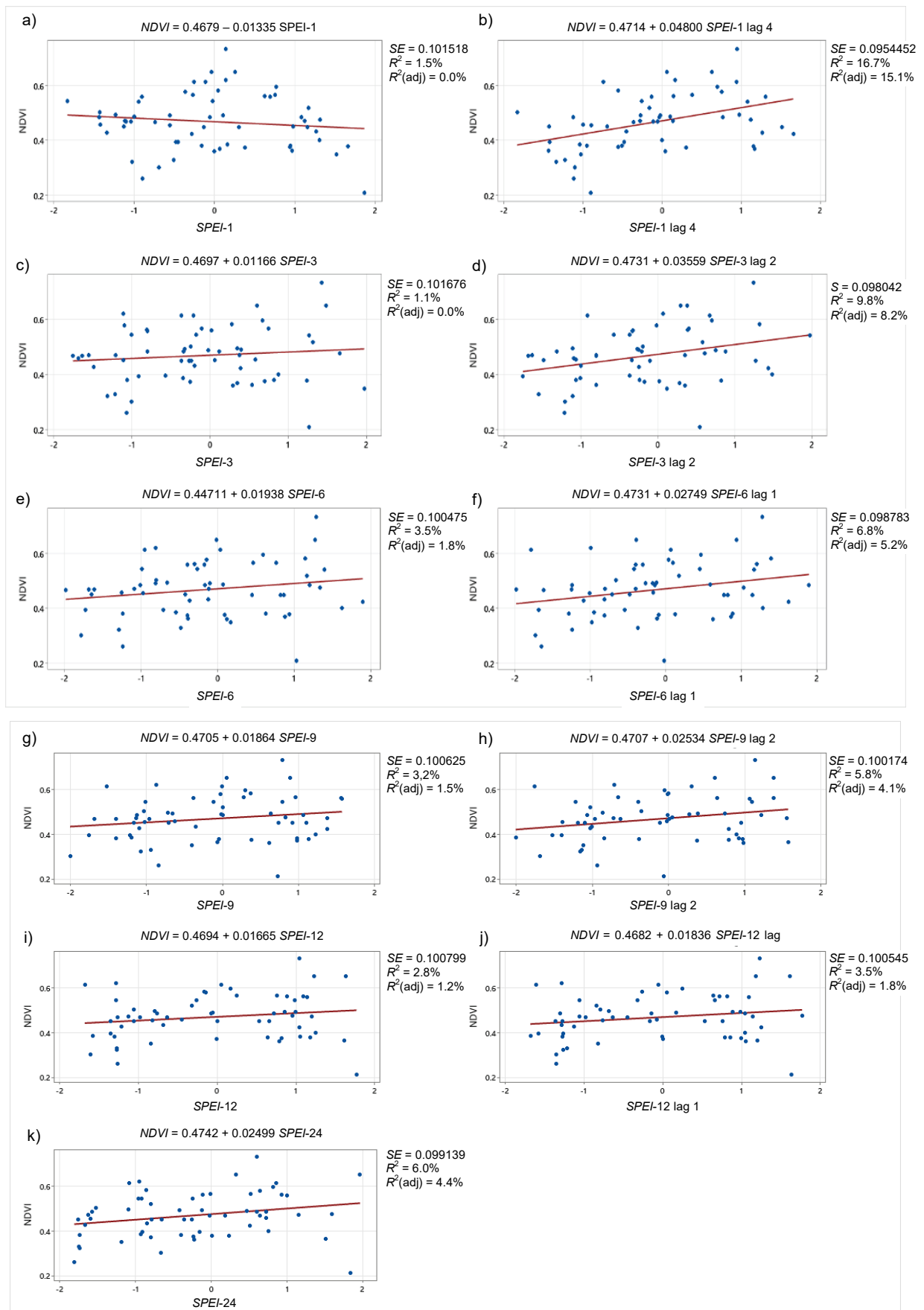
Fig. S3. Relationship between standardized precipitation evapotranspiration index (*SPEI*) and standardized precipitation evapotranspiration index lag (*SPEI* lag) to standardized normalized difference vegetation index (*NDVI*): a) *SPEI*-1, b) *SPEI*-1 lag 4, c) *SPEI*-3, d) *SPEI*-3 lag 2, e) *SPEI*-6, f) *SPEI*-6 lag 1, g) *SPEI*-9, h) *SPEI*-9 lag 2, i) *SPEI*-12, j) *SPEI*-12 lag 1, k) *SPEI*-24; *SE* = standard error, R^2 = coefficient of determination, R^2(adj) = adjusted coefficient of determination; source: own study
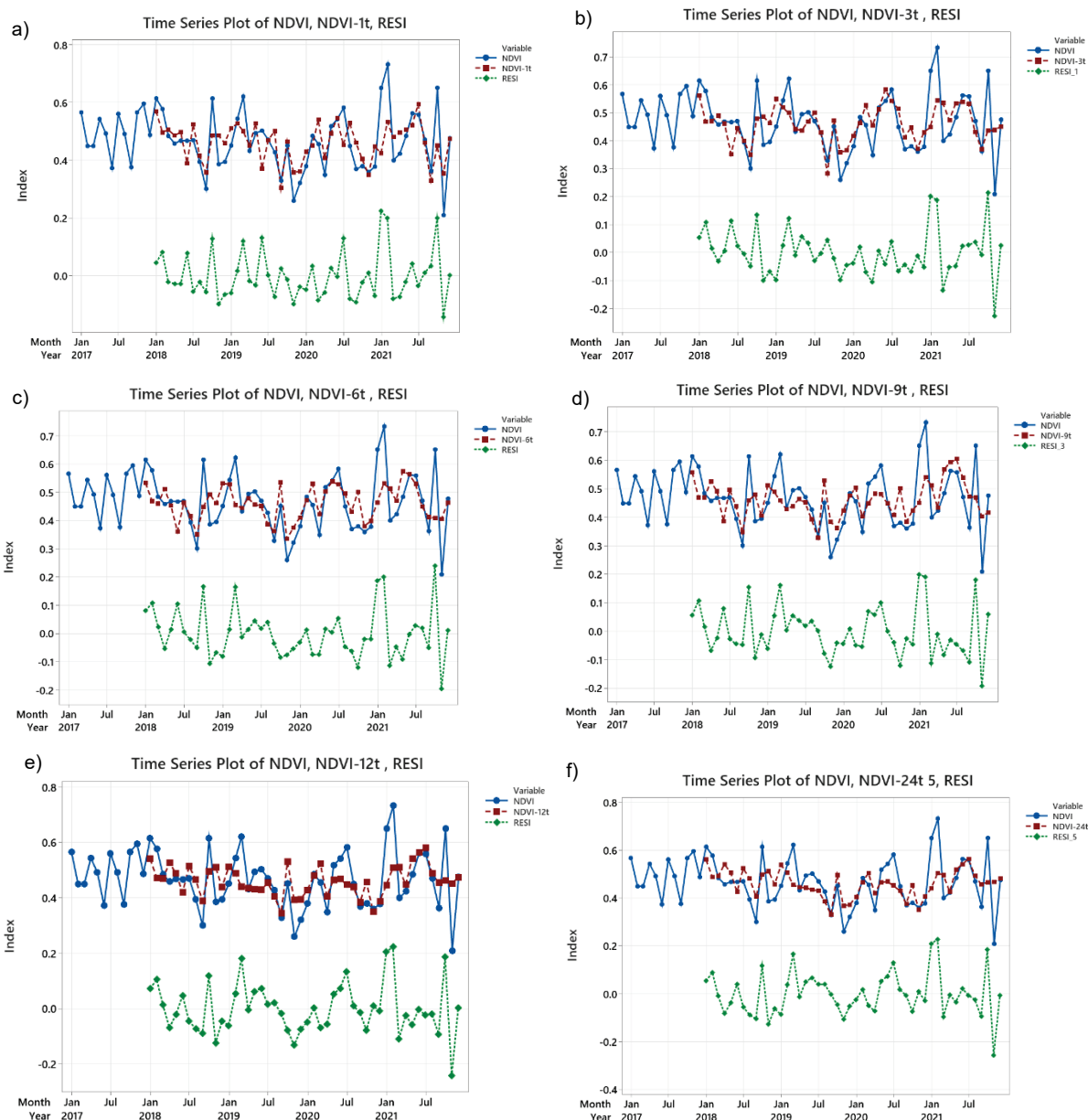
Fig. S4. Time series plot model, fit and residual (resi), standardized normalized difference vegetation index (*NDVI*) and standardized precipitation evapotranspiration index (*SPEI*): a) *NDVI*, *NDVI*-1$_t$, residual 1, b) *NDVI*, *NDVI*-3$_t$, residual 2, c) *NDVI*, *NDVI*-6$_t$, residual 3, d) *NDVI*, *NDVI*-9, residual 4, e) *NDVI*, *NDVI*-12$_t$, residual 5, f) *NDVI*, *NDVI*-24$_t$, residual 6; source: own study