
Appendix

Appendix 1: Distance from Kiriburu and Meghataburu mines of different forest classes with their foliar dust concentration

| Samples ID | Lat | Long | Forest health class | Leaf Dust Value (gm/m ²) | Kiriburu Mine to Distance (m) | Meghahatuburu Mine to Distance(m) |
|------------|-------------------|-------------------|---------------------|--------------------------------------|-------------------------------|-----------------------------------|
| 1 | 22° 11' 7.547" N | 85° 18' 53.585" E | 6 | 0.69 | 13655 | 9439 |
| 2 | 22° 11' 3.190" N | 85° 17' 52.008" E | 6 | 0.72 | 13021 | 8866 |
| 3 | 22° 11' 0.466" N | 85° 15' 31.495" E | 5 | 0.52 | 12440 | 8726 |
| 4 | 22° 9' 50.398" N | 85° 15' 44.382" E | 6 | 0.59 | 10355 | 6499 |
| 5 | 22° 10' 15.859" N | 85° 17' 13.565" E | 6 | 0.66 | 11389 | 7107 |
| 6 | 22° 9' 45.711" N | 85° 18' 7.404" E | 4 | 0.83 | 10668 | 6632 |
| 7 | 22° 8' 57.208" N | 85° 18' 26.233" E | 7 | 0.11 | 9662 | 5441 |
| 8 | 22° 8' 52.965" N | 85° 17' 42.328" E | 9 | 0.01 | 9028 | 6842 |
| 9 | 22° 9' 2.569" N | 85° 16' 33.876" E | 5 | 0.92 | 8961 | 4705 |
| 10 | 22° 9' 5.762" N | 85° 15' 5.924" E | 5 | 1.05 | 9110 | 2786 |
| 11 | 22° 8' 21.274" N | 85° 16' 1.137" E | 7 | 0.13 | 7503 | 4048 |
| 12 | 22° 7' 55.140" N | 85° 17' 7.937" E | 4 | 1.08 | 6983 | 2873 |
| 13 | 22° 8' 5.082" N | 85° 18' 10.236" E | 3 | 1.05 | 8029 | 2957 |
| 14 | 22° 8' 8.451" N | 85° 18' 36.419" E | 7 | 0.12 | 8475 | 4669 |
| 15 | 22° 7' 48.857" N | 85° 14' 50.180" E | 6 | 2.19 | 6808 | 4060 |
| 16 | 22° 7' 28.664" N | 85° 14' 52.276" E | 5 | 1.22 | 6384 | 3547 |
| 17 | 22° 7' 35.036" N | 85° 15' 24.974" E | 5 | 1.18 | 6141 | 3044 |
| 18 | 22° 7' 5.717" N | 85° 14' 38.250" E | 5 | 1.45 | 5748 | 3754 |
| 19 | 22° 6' 49.724" N | 85° 15' 51.381" E | 9 | 0.77 | 4798 | 3647 |
| 20 | 22° 6' 38.287" N | 85° 15' 27.518" E | 7 | 0.78 | 4492 | 4145 |
| 21 | 22° 6' 20.939" N | 85° 15' 54.503" E | 7 | 0.17 | 3911 | 3474 |
| 22 | 22° 6' 53.668" N | 85° 16' 38.879" E | 4 | 2.44 | 5042 | 2038 |
| 23 | 22° 7' 17.546" N | 85° 16' 59.824" E | 9 | 0.62 | 5990 | 4682 |
| 24 | 22° 7' 24.669" N | 85° 17' 22.820" E | 9 | 0.28 | 6342 | 4214 |
| 25 | 22° 7' 35.960" N | 85° 18' 14.389" E | 7 | 0.84 | 7419 | 4382 |
| 26 | 22° 6' 57.650" N | 85° 18' 11.616" E | 9 | 0.17 | 6353 | 5844 |
| 27 | 22° 6' 58.603" N | 85° 17' 39.291" E | 9 | 0.68 | 5887 | 4765 |
| 28 | 22° 6' 35.138" N | 85° 17' 16.494" E | 8 | 0.77 | 4926 | 6028 |
| 29 | 22° 6' 3.525" N | 85° 16' 56.105" E | 2 | 8.14 | 3715 | 1660 |
| 30 | 22° 5' 53.453" N | 85° 16' 39.149" E | 3 | 3.27 | 3228 | 2870 |
| 31 | 22° 6' 14.725" N | 85° 14' 53.821" E | 3 | 2.98 | 4159 | 3129 |
| 32 | 22° 5' 28.594" N | 85° 14' 43.775" E | 5 | 2.08 | 3096 | 3842 |
| 33 | 22° 5' 38.930" N | 85° 15' 25.186" E | 3 | 2.16 | 2789 | 3462 |
| 34 | 22° 5' 44.658" N | 85° 15' 38.039" E | 3 | 4.66 | 2908 | 3193 |
| 35 | 22° 5' 0.902" N | 85° 15' 8.577" E | 8 | 0.78 | 2033 | 3632 |

| | | | | | | |
|----|------------------|-------------------|---|-------|------|-------|
| 36 | 22° 5' 4.376" N | 85° 14' 31.614" E | 9 | 0.39 | 2934 | 4461 |
| 37 | 22° 4' 37.327" N | 85° 15' 16.251" E | 3 | 5.58 | 1430 | 2134 |
| 38 | 22° 4' 0.058" N | 85° 14' 10.260" E | 7 | 0.24 | 3228 | 6254 |
| 39 | 22° 3' 36.820" N | 85° 14' 42.736" E | 9 | 0.82 | 2488 | 6270 |
| 40 | 22° 5' 45.513" N | 85° 16' 3.783" E | 4 | 4.32 | 2731 | 2494 |
| 41 | 22° 5' 27.034" N | 85° 16' 5.393" E | 7 | 0.87 | 2237 | 3058 |
| 42 | 22° 5' 11.195" N | 85° 16' 12.509" E | 6 | 1.01 | 1807 | 2391 |
| 43 | 22° 5' 1.103" N | 85° 15' 53.710" E | 1 | 12.35 | 1021 | 1992 |
| 44 | 22° 4' 33.109" N | 85° 15' 50.360" E | 2 | 13.26 | 590 | 2692 |
| 45 | 22° 3' 38.451" N | 85° 15' 47.337" E | 3 | 4.08 | 1012 | 3253 |
| 46 | 22° 3' 25.021" N | 85° 15' 38.272" E | 5 | 1.98 | 1674 | 5767 |
| 47 | 22° 4' 5.019" N | 85° 14' 57.636" E | 5 | 2.92 | 1776 | 5180 |
| 48 | 22° 2' 54.556" N | 85° 15' 23.361" E | 3 | 3.28 | 2704 | 4008 |
| 49 | 22° 2' 54.824" N | 85° 15' 8.132" E | 3 | 4.25 | 2867 | 3943 |
| 50 | 22° 2' 30.231" N | 85° 14' 20.913" E | 1 | 6.46 | 4259 | 2251 |
| 51 | 22° 1' 53.747" N | 85° 13' 48.148" E | 5 | 1.88 | 5678 | 4648 |
| 52 | 22° 2' 31.508" N | 85° 13' 39.836" E | 1 | 9.28 | 5090 | 2181 |
| 53 | 22° 1' 37.144" N | 85° 14' 4.040" E | 2 | 6.59 | 5898 | 1970 |
| 54 | 22° 0' 46.446" N | 85° 14' 9.281" E | 4 | 3.65 | 7118 | 6194 |
| 55 | 22° 1' 39.790" N | 85° 14' 50.139" E | 5 | 2.19 | 5238 | 7239 |
| 56 | 22° 2' 3.250" N | 85° 15' 11.995" E | 9 | 0.92 | 4362 | 8556 |
| 57 | 22° 5' 31.349" N | 85° 16' 49.084" E | 9 | 0.89 | 2634 | 11630 |
| 58 | 22° 7' 49.848" N | 85° 16' 16.381" E | 6 | 2.89 | 6640 | 4723 |
| 59 | 22° 4' 23.461" N | 85° 15' 49.714" E | 2 | 21.56 | 395 | 2148 |
| 60 | 22° 6' 44.404" N | 85° 16' 41.721" E | 3 | 9.45 | 4772 | 452 |

1= unhealthy forest and 9 class healthy forest

Appendix 2: MNF bands, their eigenvalue, & its contribution in percentages

| MNF Band s | Eigenvalues | Contribution (%) | Cumulative (%) | MNF Bands | Eigenvalues | Contribution (%) | Cumulative (%) | MNF Bands | Eigenvalues | Contribution (%) | Cumulative (%) |
|------------|-------------|------------------|----------------|-----------|-------------|------------------|----------------|-----------|-------------|------------------|----------------|
| 1.00 | 103.88 | 22.69 | 22.69 | 51.00 | 1.41 | 0.31 | 75.72 | 101.00 | 1.14 | 0.25 | 89.40 |
| 2.00 | 48.50 | 10.59 | 33.29 | 52.00 | 1.40 | 0.31 | 76.02 | 102.00 | 1.13 | 0.25 | 89.65 |
| 3.00 | 31.17 | 6.81 | 40.09 | 53.00 | 1.40 | 0.31 | 76.33 | 103.00 | 1.13 | 0.25 | 89.90 |
| 4.00 | 24.68 | 5.39 | 45.49 | 54.00 | 1.39 | 0.30 | 76.63 | 104.00 | 1.13 | 0.25 | 90.15 |
| 5.00 | 18.88 | 4.12 | 49.61 | 55.00 | 1.39 | 0.30 | 76.94 | 105.00 | 1.13 | 0.25 | 90.39 |
| 6.00 | 11.75 | 2.57 | 52.18 | 56.00 | 1.39 | 0.30 | 77.24 | 106.00 | 1.13 | 0.25 | 90.64 |
| 7.00 | 8.89 | 1.94 | 54.12 | 57.00 | 1.39 | 0.30 | 77.54 | 107.00 | 1.13 | 0.25 | 90.88 |
| 8.00 | 5.37 | 1.17 | 55.29 | 58.00 | 1.38 | 0.30 | 77.84 | 108.00 | 1.13 | 0.25 | 91.13 |
| 9.00 | 3.54 | 0.77 | 56.06 | 59.00 | 1.37 | 0.30 | 78.14 | 109.00 | 1.12 | 0.24 | 91.38 |
| 10.00 | 3.29 | 0.72 | 56.78 | 60.00 | 1.37 | 0.30 | 78.44 | 110.00 | 1.12 | 0.24 | 91.62 |
| 11.00 | 3.22 | 0.70 | 57.49 | 61.00 | 1.37 | 0.30 | 78.74 | 111.00 | 1.12 | 0.24 | 91.86 |

| | | | | | | | | | | | |
|-------|------|------|-------|-------|------|------|-------|--------|------|------|--------|
| 12.00 | 3.08 | 0.67 | 58.16 | 62.00 | 1.37 | 0.30 | 79.04 | 112.00 | 1.12 | 0.24 | 92.11 |
| 13.00 | 2.84 | 0.62 | 58.78 | 63.00 | 1.36 | 0.30 | 79.34 | 113.00 | 1.11 | 0.24 | 92.35 |
| 14.00 | 2.82 | 0.62 | 59.40 | 64.00 | 1.36 | 0.30 | 79.64 | 114.00 | 1.11 | 0.24 | 92.59 |
| 15.00 | 2.73 | 0.60 | 59.99 | 65.00 | 1.35 | 0.30 | 79.93 | 115.00 | 1.11 | 0.24 | 92.84 |
| 16.00 | 2.69 | 0.59 | 60.58 | 66.00 | 1.35 | 0.29 | 80.22 | 116.00 | 1.11 | 0.24 | 93.08 |
| 17.00 | 2.68 | 0.59 | 61.17 | 67.00 | 1.33 | 0.29 | 80.52 | 117.00 | 1.11 | 0.24 | 93.32 |
| 18.00 | 2.64 | 0.58 | 61.74 | 68.00 | 1.32 | 0.29 | 80.80 | 118.00 | 1.11 | 0.24 | 93.56 |
| 19.00 | 2.62 | 0.57 | 62.32 | 69.00 | 1.31 | 0.29 | 81.09 | 119.00 | 1.11 | 0.24 | 93.81 |
| 20.00 | 2.58 | 0.56 | 62.88 | 70.00 | 1.30 | 0.28 | 81.37 | 120.00 | 1.11 | 0.24 | 94.05 |
| 21.00 | 2.58 | 0.56 | 63.44 | 71.00 | 1.28 | 0.28 | 81.65 | 121.00 | 1.10 | 0.24 | 94.29 |
| 22.00 | 2.57 | 0.56 | 64.01 | 72.00 | 1.27 | 0.28 | 81.93 | 122.00 | 1.10 | 0.24 | 94.53 |
| 23.00 | 2.56 | 0.56 | 64.57 | 73.00 | 1.25 | 0.27 | 82.20 | 123.00 | 1.10 | 0.24 | 94.77 |
| 24.00 | 2.56 | 0.56 | 65.12 | 74.00 | 1.24 | 0.27 | 82.47 | 124.00 | 1.10 | 0.24 | 95.01 |
| 25.00 | 2.55 | 0.56 | 65.68 | 75.00 | 1.23 | 0.27 | 82.74 | 125.00 | 1.10 | 0.24 | 95.25 |
| 26.00 | 2.54 | 0.55 | 66.24 | 76.00 | 1.22 | 0.27 | 83.01 | 126.00 | 1.10 | 0.24 | 95.49 |
| 27.00 | 2.53 | 0.55 | 66.79 | 77.00 | 1.22 | 0.27 | 83.28 | 127.00 | 1.10 | 0.24 | 95.73 |
| 28.00 | 2.52 | 0.55 | 67.34 | 78.00 | 1.21 | 0.26 | 83.54 | 128.00 | 1.10 | 0.24 | 95.97 |
| 29.00 | 2.51 | 0.55 | 67.89 | 79.00 | 1.21 | 0.26 | 83.81 | 129.00 | 1.09 | 0.24 | 96.21 |
| 30.00 | 2.26 | 0.49 | 68.38 | 80.00 | 1.20 | 0.26 | 84.07 | 130.00 | 1.09 | 0.24 | 96.45 |
| 31.00 | 2.20 | 0.48 | 68.86 | 81.00 | 1.20 | 0.26 | 84.33 | 131.00 | 1.09 | 0.24 | 96.69 |
| 32.00 | 2.19 | 0.48 | 69.34 | 82.00 | 1.20 | 0.26 | 84.59 | 132.00 | 1.09 | 0.24 | 96.93 |
| 33.00 | 2.29 | 0.50 | 69.84 | 83.00 | 1.19 | 0.26 | 84.85 | 133.00 | 1.09 | 0.24 | 97.17 |
| 34.00 | 2.38 | 0.52 | 70.36 | 84.00 | 1.19 | 0.26 | 85.11 | 134.00 | 1.09 | 0.24 | 97.40 |
| 35.00 | 1.48 | 0.32 | 70.68 | 85.00 | 1.19 | 0.26 | 85.37 | 135.00 | 1.09 | 0.24 | 97.64 |
| 36.00 | 1.47 | 0.32 | 71.00 | 86.00 | 1.17 | 0.26 | 85.63 | 136.00 | 1.09 | 0.24 | 97.88 |
| 37.00 | 1.47 | 0.32 | 71.33 | 87.00 | 1.17 | 0.26 | 85.88 | 137.00 | 1.09 | 0.24 | 98.12 |
| 38.00 | 1.46 | 0.32 | 71.64 | 88.00 | 1.17 | 0.26 | 86.14 | 138.00 | 1.08 | 0.24 | 98.35 |
| 39.00 | 1.46 | 0.32 | 71.96 | 89.00 | 1.16 | 0.25 | 86.39 | 139.00 | 1.08 | 0.24 | 98.59 |
| 40.00 | 1.45 | 0.32 | 72.28 | 90.00 | 1.16 | 0.25 | 86.65 | 140.00 | 1.08 | 0.24 | 98.82 |
| 41.00 | 1.45 | 0.32 | 72.60 | 91.00 | 1.16 | 0.25 | 86.90 | 141.00 | 1.08 | 0.24 | 99.06 |
| 42.00 | 1.44 | 0.32 | 72.91 | 92.00 | 1.16 | 0.25 | 87.15 | 142.00 | 1.08 | 0.24 | 99.30 |
| 43.00 | 1.44 | 0.31 | 73.23 | 93.00 | 1.16 | 0.25 | 87.41 | 143.00 | 1.08 | 0.23 | 99.53 |
| 44.00 | 1.44 | 0.31 | 73.54 | 94.00 | 1.15 | 0.25 | 87.66 | 144.00 | 1.07 | 0.23 | 99.77 |
| 45.00 | 1.44 | 0.31 | 73.85 | 95.00 | 1.15 | 0.25 | 87.91 | 145.00 | 1.07 | 0.23 | 100.00 |
| 46.00 | 1.43 | 0.31 | 74.17 | 96.00 | 1.15 | 0.25 | 88.16 | | | | |
| 47.00 | 1.43 | 0.31 | 74.48 | 97.00 | 1.14 | 0.25 | 88.41 | | | | |

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|-------|------|------|-------|--------|------|------|-------|
| 48.00 | 1.42 | 0.31 | 74.79 | 98.00 | 1.14 | 0.25 | 88.66 |
| 49.00 | 1.42 | 0.31 | 75.10 | 99.00 | 1.14 | 0.25 | 88.91 |
| 50.00 | 1.41 | 0.31 | 75.41 | 100.00 | 1.14 | 0.25 | 89.16 |

Appendix 3: Causative parameters details used for forest health risk assessment and its prediction

| Present causative parameters | Name of parameters | Data types | Scale/ Resolution | Periods | Source of the data |
|------------------------------|--------------------|------------------|-------------------|----------------|----------------------|
| Climate | Max temperature | Non spatial | 1km | Past & Present | NCEP |
| | Rainfall | Non spatial | 1km | Past & Present | NCEP |
| | Wind speed | Non spatial | 1km | Past & Present | NCEP |
| | Drought | Raster grid | 30m | Past & Present | Landsat OLI ,climate |
| Geomorph ic | Soil type | Polygon coverage | 1:50000 | Past & Present | NBSS |
| | Lithology | Polygon coverage | 1:50000 | Past & Present | GSI |
| | Geomorphology | Polygon coverage | 1:50000 | Past & Present | Bhuvan |
| | LULC | Raster grid | 30m | Past & Present | Landsat OLI |
| Topograph y | Slope | Raster grid | 30m | Past & Present | Cartosat -1 DEM |
| | Elevation | Raster grid | 30m | Past & Present | Cartosat -1 DEM |
| Environme ntal | LST | Raster grid | 30m | Past & Present | Landsat OLI |
| | Hot spot | Raster grid | 30m | Past & Present | Landsat OLI |
| | Foliar dust | Raster grid | 30m | Past & Present | Hypeion |
| Forestry | Forest density | Polygon coverage | 1:50000 | Past & Present | Forest Department |
| | Forest health | Raster grid | 30m | Past & Present | Hyperion data |
| | Tree species | Raster grid | 30m | Past & Present | Hyperion data |
| | Deforestation | Raster grid | 30m | Past & Present | Landsat OLI |
| | Plant diversity | Raster grid | 30m | Past & | Hyperion |

| | | | | | |
|--------------------------------|--|------------------|----------|----------------|----------------------------|
| | | | | Present | data |
| | NDVI | Raster grid | 30m | Past & Present | Landsat OLI |
| Anthropogenic | Distance from mines | Polygon coverage | 15m Apx. | Past & Present | Google Earth imagery |
| | Distance from roads | Polygon coverage | 15m Apx. | Past & Present | Google Earth imagery |
| | Distance from settlements | Polygon coverage | 15m Apx. | Past & Present | Google Earth imagery |
| | | | | | |
| Predicted parameters | Predicted Min temperature | Non spatial | 1km | Predicted | IPCC (RCP 4.5) |
| Climate Geomorphic, & Forestry | Predicted Max temperature | Non spatial | 1km | Predicted | IPCC (RCP 4.5) |
| | Predicted deforestation susceptibility | Raster grid | 30m | Predicted | Sentinel -1 & Google Earth |
| | Predicted Solar radiation | Non spatial | 1km | Predicted | IPCC (RCP 4.5) |
| | Predicted Rainfall | Non spatial | 1km | Predicted | IPCC (RCP 4.5) |
| | Predicted LULC | Raster grid | 30m | Prediction | Landsat OLI |

Appendix 4: Assigned and normalized weights of sub features for the twenty-two present and six predicted parameters for FHR assessment and prediction

| SL No. | Factors | Features | Short Name | Weight | Feature Classes | Area in (%) | Weight Assigned (Sub-Class) | Normalized weight |
|--------|---------|------------------|------------|--------|-----------------|-------------|-----------------------------|-------------------|
| 1 | Climate | Temperature (°C) | T | 7 | 24-26°C | 3.18 | 3 | 0.14 |
| | | | | | 26-28°C | 18.83 | 4 | 0.18 |
| | | | | | 28-30°C | 27.04 | 5 | 0.23 |
| | | | | | 30-32°C | 30.72 | 6 | 0.27 |
| | | | | | 32-34°C | 20.20 | 7 | 0.32 |
| | | Rainfall (mm) | R | 5 | 1469-1487mm | 2.42 | 6 | 0.30 |
| | | | | | 1487-1505mm | 16.36 | 5 | 0.25 |
| | | | | | 1505 - 1530mm | 27.37 | 4 | 0.20 |
| | | | | | 1530 - 1550mm | 24.36 | 3 | 0.15 |
| | | | | | 1550 - 1575mm | 19.75 | 2 | 0.10 |

| | | | | | | | |
|---|------------|---------------|----|---------------|-------|---|------|
| | | | | 1545mm | | | |
| | | | | 1545-1575mm | 29.46 | 2 | 0.10 |
| | | Wind Speed | WS | 1.85-2.05m/s | 2.76 | 2 | 0.07 |
| | | (m/s) | | 2.05-2.21m/s | 17.46 | 3 | 0.13 |
| | | | | 2.21-2.41m/s | 22.57 | 4 | 0.20 |
| | | | | 2.41-2.68m/s | 26.00 | 5 | 0.27 |
| | | | 6 | 2.68-2.98m/s | 31.18 | 6 | 0.33 |
| | | Drought | D | High | 24.50 | 8 | 0.47 |
| | | | | Medium | 53.34 | 6 | 0.35 |
| | | | 7 | Low | 22.15 | 3 | 0.18 |
| 2 | Natural or | Soil | S | Fine loamy | 7.05 | 3 | 0.33 |
| | Geomorphic | | | Coarse Loamy | 19.86 | 2 | 0.22 |
| | | | | Very fine | | | |
| | | | 4 | loamy | 73.07 | 4 | 0.44 |
| | | Lithology | L | Magniferous | | | |
| | | | | Shale, | 84.36 | 3 | 0.19 |
| | | | | Iron Ore | 3.34 | 6 | 0.38 |
| | | | | Banded | | | |
| | | | | Hematite | 6.37 | 4 | 0.25 |
| | | | | Lava | 1.06 | 2 | 0.13 |
| | | | | Metavolcanic, | | | |
| | | | 3 | intrusive | 4.84 | 1 | 0.06 |
| | | Geomorphology | G | Structural | | | |
| | | | | Origin | 84.53 | 6 | 0.30 |
| | | | | Denudational | | | |
| | | | | Origin- | 11.32 | 7 | 0.35 |
| | | | | Anthropogenic | | | |
| | | | | Origin - | 2.47 | 5 | 0.25 |
| | | | 4 | Water bodies- | 1.66 | 2 | 0.10 |
| | | LULC | LU | Open Forest | 27.87 | 5 | 0.17 |
| | | | | Moderate | | | |
| | | | | forest | 41.15 | 4 | 0.14 |
| | | | | Agricultural | | | |
| | | | | land | 3.69 | 3 | 0.10 |
| | | | | Fallow land | 2.03 | 4 | 0.14 |
| | | | | Settlement | 0.46 | 4 | 0.17 |
| | | | | Water body | 0.53 | 3 | 0.10 |
| | | | | Dense forest | 21.55 | 2 | 0.07 |
| | | | 5 | Mining area | 2.69 | 6 | 0.21 |
| 3 | Forest | Forest health | FH | Class-1 | 12.29 | 9 | 0.17 |
| | | | | Class-2 | 11.01 | 8 | 0.17 |
| | | | | Class-3 | 11.47 | 7 | 0.15 |
| | | | 8 | Class-4 | 10.87 | 6 | 0.13 |

| | | | | | | | |
|---|----------------|---------|---|----------------|-------|---|------|
| | | | | Class-5 | 12.04 | 5 | 0.11 |
| | | | | Class-6 | 12.53 | 4 | 0.09 |
| | | | | Class-7 | 8.98 | 3 | 0.07 |
| | | | | Class-8 | 8.67 | 2 | 0.06 |
| | | | | Class-9 | 12.09 | 1 | 0.04 |
| | Forest density | FD/T | | Medium | | | |
| | or Type | | | Dense Forest | 55.31 | 4 | 0.21 |
| | | | | Open Forest | 9.89 | 5 | 0.26 |
| | | | | Non Forest | 14.69 | 7 | 0.37 |
| | | | | Very Dense | | | |
| | | | 6 | Forest | 20.09 | 3 | 0.16 |
| | Tree species | TSD | | 0-0.37 | 16.47 | 5 | 0.33 |
| | diversity | | | 0.37-0.74 | 25.78 | 4 | 0.27 |
| | | | | 0.74-1.11 | 31.26 | 3 | 0.20 |
| | | | | 1.11-1.48 | 9.47 | 2 | 0.13 |
| | | | 7 | 1.48-1.85 | 17.25 | 1 | 0.07 |
| | Tree species | TS | | No forest area | 12.20 | 6 | 0.27 |
| | | | | Sal | 48.63 | 5 | 0.23 |
| | | | | Teak | 21.93 | 4 | 0.18 |
| | | | | Akasmani | 6.05 | 3 | 0.14 |
| | | | | Palash | 4.45 | 1 | 0.05 |
| | | | | Mohwa | 3.85 | 1 | 0.05 |
| | | | 6 | Bot or wad | 2.86 | 2 | 0.09 |
| | NDVI | N | | -0.03 to -0.16 | 0.03 | 5 | 0.33 |
| | | | | -0.16 to 0.3 | 10.95 | 4 | 0.27 |
| | | | | 0.3 to 0.10 | 29.87 | 3 | 0.20 |
| | | | | 0.10 to 0.17 | 35.34 | 2 | 0.13 |
| | | | 4 | 0.17 to 0.45 | 23.79 | 1 | 0.07 |
| | Deforestation | DF | | Non Forest | | | |
| | | | | Area | 17.19 | 4 | 0.33 |
| | | | | Forest Area | 75.64 | 2 | 0.17 |
| | | | | Deforestation | | | |
| | | | 6 | Area | 7.15 | 6 | 0.50 |
| 4 | Topographic | Slope ° | S | 0 to 6° | 50.55 | 2 | 0.10 |
| | | | | 6 to 12° | 32.06 | 3 | 0.15 |
| | | | | 12 to 18° | 13.87 | 4 | 0.20 |
| | | | | 18-24° | 3.21 | 5 | 0.25 |
| | | | 5 | 24-34° | 0.29 | 6 | 0.30 |
| | Altitude (m) | A | | 0-410m | 27.03 | 2 | 0.10 |
| | | | | 410-484m | 23.82 | 3 | 0.15 |
| | | | | 484-559m | 22.23 | 4 | 0.20 |
| | | | | 559-740m | 16.89 | 5 | 0.25 |
| | | | 5 | 740-860m | 10.01 | 6 | 0.30 |

| | | | | | | | | |
|---|---------------|------------------------------------|--------------------|--------------------|---------------------------|-------|------|------|
| 5 | Environmental | LST (°C) | LST | 15-22 C | 13.52 | 4 | 0.13 | |
| | | | | 22-28 C | 23.79 | 5 | 0.17 | |
| | | | | 28-32 C | 35.52 | 6 | 0.20 | |
| | | | | 32-36 C | 22.75 | 7 | 0.23 | |
| | | | | 36-40 C | 4.39 | 8 | 0.27 | |
| | | Hot spot | HS | 8 | -0.2 | 30.59 | 3 | 0.12 |
| | | | | | 0 to 1 | 10.36 | 4 | 0.16 |
| | | | | | 1 to 4 | 17.79 | 5 | 0.20 |
| | | | | | 4 to 6 | 31.69 | 6 | 0.24 |
| | | | | | 6 to 7 | 9.54 | 7 | 0.28 |
| | | Foliar dust (g/m ²) | FD | 7 | 4 to 40 g/m ² | 5.20 | 2 | 0.08 |
| | | | | | 40 to 50 g/m ² | 21.82 | 3 | 0.12 |
| | | | | | 50 to 60 g/m ² | 65.15 | 4 | 0.15 |
| | | | | | 60 to 70 g/m ² | 7.00 | 8 | 0.31 |
| | | | | | 70 to 80 g/m ² | 0.81 | 9 | 0.35 |
| 6 | Anthropogenic | Distance from Mines | DM | Very Low | | | | |
| | | | | Distance | 27.44 | 1 | 0.37 | |
| | | | | Low Distance | 28.13 | 2 | 0.32 | |
| | | | | Medium distance | 22.95 | 3 | 0.16 | |
| | | | | Highly Distance | 14.78 | 6 | 0.11 | |
| | | Distance from Road | DR | 7 | Very Highly Distance | 6.69 | 7 | 0.05 |
| | | | | | Very Low | | | |
| | | | | | Distance | 3.30 | 1 | 0.37 |
| | | | | | Low Distance | 8.09 | 2 | 0.32 |
| | | | | | Medium distance | 31.47 | 3 | 0.16 |
| | | Distance from Settlement | DS | 4 | Highly Distance | 36.09 | 6 | 0.11 |
| | | | | | Very Highly | | | |
| | | | | | Distance | 21.03 | 7 | 0.05 |
| | | | | | Very Low | | | |
| | | | | | Distance | 7.82 | 1 | 0.33 |
| | | | Low Distance | 13.57 | 2 | 0.27 | | |
| | | | Medium distance | 41.41 | 3 | 0.20 | | |
| | | | Highly Distance | 20.96 | 4 | 0.13 | | |
| | | | Very Highly | | | | | |
| | | | Distance | 16.22 | 5 | 0.07 | | |
| 7 | | | | Distance | 16.22 | 5 | 0.07 | |

| SL No. | Factors 2030 | Features | Short Name | Weight | Feature Classes | Area in (%) | Weight Assigned (Sub-Class) | Normalized weight |
|--------|--------------|-------------------------------------|------------|--------|-------------------|-------------|-----------------------------|-------------------|
| 1 | Climate | Max Temperature (°C) (2030) | MT | 7 | 31.17-31.90°C | 2.75 | 1 | 0.07 |
| | | | | | 31.90-32.38°C | 15.96 | 2 | 0.13 |
| | | | | | 32.38-32.75°C | 21.35 | 3 | 0.20 |
| | | | | | 32.75-33.13°C | 23.69 | 5 | 0.33 |
| 2 | | Mini Temperature (°C) (2030) | MT | 3 | 33.13-33.60°C | 36.23 | 4 | 0.27 |
| | | | | | 20.34-20.92 C | 2.81 | 1 | 0.07 |
| | | | | | 20.92-21.30 C | 17.45 | 2 | 0.13 |
| | | | | | 21.30-21.61 C | 19.95 | 3 | 0.20 |
| 3 | | Rainfall (mm) (2030) | R | 4 | 21.61-21.91 C | 22.98 | 5 | 0.33 |
| | | | | | 21.91-22.29 C | 36.79 | 4 | 0.27 |
| | | | | | 1483-1519mm | 6.73 | 5 | 0.22 |
| | | | | | 1519-1545mm | 17.85 | 4 | 0.13 |
| 4 | | Solar radiation (W/m²) (2030) | SR | 4 | 1545-1565mm | 24.16 | 3 | 0.11 |
| | | | | | 1565-1581mm | 24.74 | 2 | 0.08 |
| | | | | | 1581-1606mm | 26.50 | 1 | 0.05 |
| | | | | | 17.27-17.42 W/m² | 3.94 | 2 | 0.10 |
| 5 | Geomorphic | LULC (2030) | LU | 5 | 17.42-17.52 W/m² | 20.60 | 3 | 0.15 |
| | | | | | 17.52-17.59 W/m² | 24.87 | 4 | 0.20 |
| | | | | | 17.59-17.68 W/m² | 16.98 | 5 | 0.25 |
| | | | | | 17.68-17.80 W/m² | 33.58 | 6 | 0.25 |
| 6 | Forest | Deforestation Susceptibility (2030) | DS | 5 | Dense forest | 22.64 | 5 | 0.06 |
| | | | | | Open Forest | 28.87 | 4 | 0.12 |
| | | | | | Moderate forest | 39.15 | 3 | 0.13 |
| | | | | | Agricultural land | 4.25 | 4 | 0.14 |
| 6 | | | | 6 | Fallow land | 0.71 | 5 | 0.18 |
| | | | | | Water body | 0.47 | 2 | 0.08 |
| | | | | | Mining area | 3.11 | 3 | 0.26 |
| | | | | | Settlement | 0.64 | 5 | 0.16 |
| 6 | | | | 6 | Very low | 8.50 | 1 | 0.07 |
| | | | | | Low | 32.81 | 2 | 0.13 |
| | | | | | Medium | 32.06 | 3 | 0.20 |
| | | | | | High | 18.06 | 4 | 0.27 |
| 6 | | | | 6 | Very high | 8.54 | 5 | 0.33 |

| SL No. | Factors 2050 | Features | Short Name | Weight | Feature Classes | Area in (%) | Weight Assigned (Sub-Class) | Normalized weight |
|--------|--------------|------------------------------|------------|--------|-----------------|-------------|-----------------------------|-------------------|
| 1 | Climate | Max Temperature (°C) (2050) | Max T | 7 | 41.63-42.54°C | 5.95 | 2 | 0.11 |
| | | | | | 52.54-43.11°C | 21.95 | 3 | 0.16 |
| | | | | | 43.11-43.71°C | 19.25 | 4 | 0.21 |
| | | | | | 43.71-44.29°C | 22.59 | 5 | 0.26 |
| 2 | | Mini Temperature (°C) (2050) | Min T | 3 | 44.29-44.80°C | 31.23 | 6 | 0.28 |
| | | | | | 26.96-27.71°C | 5.99 | 1 | 0.07 |
| | | | | | 27.71-28.18°C | 19.65 | 2 | 0.11 |
| | | | | | 28.18-28.68°C | 18.3 | 3 | 0.13 |

| | | | | | | | |
|-----------|---|---|-----------------------|-----------------------|-------|------|------|
| 3 | Rainfall (mm) (2050) | R | 28.68-29.14°C | 21.62 | 4 | 0.20 | |
| | | | 29.14-29.53°C | 31.41 | 5 | 0.27 | |
| | | | 1485.28- | | | | |
| | | | 1519.461mm | 11.95 | 2 | 0.29 | |
| | | | 1519.46- | | | | |
| | | | 1545.50mm | 14.92 | 3 | 0.18 | |
| | | | 1545.50- | | | | |
| 4 | Solar radiation (W/m ²) (2050) | SR | 1565.76mm | 21.02 | 4 | 0.12 | |
| | | | 1565.76- | | | | |
| | | | 1581.68mm | 23.4 | 3 | 0.08 | |
| | | | 1581.68- | | | | |
| | | | 1606.27mm | 28.7 | 5 | 0.05 | |
| | | | 22.20- | | | | |
| | | | 23.41W/m ² | 7.96 | 2 | 0.11 | |
| 5 | Geomorphic | LULC (2050) | LU | 23.41- | | | |
| | | | | 23.55W/m ² | 18.24 | 3 | 0.16 |
| | | | | 23.55- | | | |
| | | | | 23.69W/m ² | 16.89 | 4 | 0.21 |
| | | | | 23.69- | | | |
| | | | | 23.82W/m ² | 22.37 | 5 | 0.23 |
| | | | | 23.82- | | | |
| 6 | Forest | Deforestation Susceptibility (2050) | DS | 23.94W/m ² | 34.52 | 5 | 0.26 |
| | | | | Dense forest | 17.71 | 5 | 0.17 |
| | | | | Open Forest | 31.15 | 4 | 0.14 |
| | | | | Moderate forest | 38.21 | 3 | 0.10 |
| | | | | Agricultural land | 5.21 | 4 | 0.14 |
| | | | | Fallow land | 1.19 | 2 | 0.20 |
| | | | | Mining area | 5.05 | 3 | 0.27 |
| | | | | Water body | 0.39 | 2 | 0.07 |
| | | | | Settlement | 0.75 | 4 | 0.17 |
| | | | | Very low | 18.26 | 6 | 0.34 |
| | | | | low | 27.49 | 5 | 0.20 |
| medium | 27.29 | 3 | 0.13 | | | | |
| high | 16.47 | 2 | 0.11 | | | | |
| very high | 10.47 | 1 | 0.08 | | | | |

Appendix 5: FHR and sensitive parameter's pixel values of sixty field sample points

| SLI | FHR | MD | D | FD | LS | T | DF | TS | HS | N | WS | FM | FD | A |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| D | 2016 | | | | T | | | D | | | | T | S | |
| 1 | 0.18 | 0.32 | 0.35 | 0.31 | 0.22 | 0.25 | 0.17 | 0.27 | 0.16 | 0.20 | 0.33 | 0.13 | 0.20 | 0.15 |
| 2 | 0.18 | 0.32 | 0.35 | 0.15 | 0.20 | 0.26 | 0.17 | 0.20 | 0.12 | 0.13 | 0.33 | 0.13 | 0.13 | 0.1 |
| 3 | 0.18 | 0.16 | 0.18 | 0.15 | 0.27 | 0.27 | 0.17 | 0.33 | 0.12 | 0.13 | 0.33 | 0.13 | 0.20 | 0.15 |
| 4 | 0.17 | 0.11 | 0.35 | 0.15 | 0.20 | 0.24 | 0.17 | 0.20 | 0.12 | 0.07 | 0.27 | 0.13 | 0.20 | 0.2 |
| 5 | 0.17 | 0.16 | 0.47 | 0.15 | 0.28 | 0.27 | 0.17 | 0.20 | 0.16 | 0.13 | 0.33 | 0.07 | 0.13 | 0.2 |
| 6 | 0.18 | 0.16 | 0.35 | 0.15 | 0.20 | 0.27 | 0.17 | 0.20 | 0.16 | 0.20 | 0.33 | 0.07 | 0.20 | 0.1 |
| 7 | 0.18 | 0.11 | 0.35 | 0.15 | 0.20 | 0.27 | 0.17 | 0.13 | 0.16 | 0.27 | 0.27 | 0.20 | 0.20 | 0.15 |
| 8 | 0.18 | 0.16 | 0.18 | 0.15 | 0.23 | 0.27 | 0.17 | 0.20 | 0.20 | 0.20 | 0.27 | 0.20 | 0.13 | 0.15 |
| 9 | 0.19 | 0.16 | 0.18 | 0.12 | 0.27 | 0.27 | 0.17 | 0.20 | 0.24 | 0.20 | 0.27 | 0.20 | 0.33 | 0.15 |
| 10 | 0.17 | 0.11 | 0.35 | 0.15 | 0.20 | 0.26 | 0.17 | 0.20 | 0.16 | 0.13 | 0.27 | 0.13 | 0.13 | 0.2 |
| 11 | 0.19 | 0.32 | 0.47 | 0.12 | 0.24 | 0.27 | 0.17 | 0.13 | 0.24 | 0.07 | 0.27 | 0.20 | 0.20 | 0.15 |
| 12 | 0.18 | 0.32 | 0.35 | 0.15 | 0.20 | 0.27 | 0.17 | 0.13 | 0.24 | 0.13 | 0.20 | 0.20 | 0.13 | 0.15 |
| 13 | 0.19 | 0.11 | 0.18 | 0.15 | 0.23 | 0.32 | 0.17 | 0.20 | 0.24 | 0.20 | 0.20 | 0.27 | 0.13 | 0.15 |
| 14 | 0.18 | 0.05 | 0.35 | 0.12 | 0.23 | 0.32 | 0.17 | 0.13 | 0.24 | 0.13 | 0.20 | 0.27 | 0.27 | 0.2 |
| 15 | 0.21 | 0.16 | 0.35 | 0.15 | 0.23 | 0.27 | 0.17 | 0.33 | 0.24 | 0.13 | 0.27 | 0.20 | 0.20 | 0.15 |
| 16 | 0.20 | 0.32 | 0.47 | 0.15 | 0.21 | 0.27 | 0.17 | 0.20 | 0.24 | 0.13 | 0.27 | 0.20 | 0.13 | 0.25 |
| 17 | 0.20 | 0.37 | 0.47 | 0.15 | 0.21 | 0.27 | 0.17 | 0.20 | 0.28 | 0.07 | 0.27 | 0.20 | 0.13 | 0.25 |
| 18 | 0.19 | 0.16 | 0.35 | 0.12 | 0.20 | 0.27 | 0.17 | 0.20 | 0.24 | 0.07 | 0.27 | 0.20 | 0.13 | 0.25 |
| 19 | 0.20 | 0.37 | 0.47 | 0.15 | 0.21 | 0.27 | 0.17 | 0.20 | 0.24 | 0.07 | 0.20 | 0.20 | 0.13 | 0.25 |
| 20 | 0.20 | 0.37 | 0.47 | 0.15 | 0.25 | 0.27 | 0.17 | 0.13 | 0.24 | 0.13 | 0.20 | 0.20 | 0.13 | 0.25 |
| 21 | 0.19 | 0.37 | 0.47 | 0.12 | 0.23 | 0.27 | 0.17 | 0.13 | 0.24 | 0.07 | 0.20 | 0.20 | 0.13 | 0.25 |
| 22 | 0.20 | 0.37 | 0.47 | 0.12 | 0.24 | 0.27 | 0.17 | 0.13 | 0.24 | 0.13 | 0.20 | 0.27 | 0.20 | 0.3 |
| 23 | 0.19 | 0.32 | 0.35 | 0.15 | 0.24 | 0.32 | 0.17 | 0.13 | 0.28 | 0.07 | 0.20 | 0.27 | 0.27 | 0.3 |
| 24 | 0.20 | 0.16 | 0.47 | 0.15 | 0.25 | 0.32 | 0.50 | 0.07 | 0.28 | 0.20 | 0.20 | 0.27 | 0.13 | 0.3 |
| 25 | 0.19 | 0.05 | 0.47 | 0.15 | 0.26 | 0.32 | 0.17 | 0.27 | 0.28 | 0.07 | 0.20 | 0.27 | 0.13 | 0.3 |
| 26 | 0.19 | 0.05 | 0.18 | 0.15 | 0.27 | 0.32 | 0.17 | 0.13 | 0.28 | 0.13 | 0.20 | 0.27 | 0.27 | 0.3 |

| | | | | | | | | | | | | | | |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 27 | 0.18 | 0.16 | 0.18 | 0.15 | 0.23 | 0.32 | 0.17 | 0.07 | 0.28 | 0.20 | 0.20 | 0.27 | 0.33 | 0.3 |
| 28 | 0.20 | 0.32 | 0.35 | 0.12 | 0.23 | 0.32 | 0.17 | 0.07 | 0.28 | 0.13 | 0.20 | 0.27 | 0.33 | 0.25 |
| 29 | 0.23 | 0.32 | 0.35 | 0.08 | 0.23 | 0.32 | 0.17 | 0.33 | 0.24 | 0.20 | 0.20 | 0.27 | 0.27 | 0.25 |
| 30 | 0.21 | 0.32 | 0.35 | 0.12 | 0.20 | 0.32 | 0.17 | 0.33 | 0.24 | 0.13 | 0.20 | 0.27 | 0.20 | 0.25 |
| 31 | 0.20 | 0.32 | 0.47 | 0.15 | 0.21 | 0.27 | 0.17 | 0.20 | 0.24 | 0.20 | 0.20 | 0.27 | 0.13 | 0.25 |
| 32 | 0.18 | 0.16 | 0.47 | 0.15 | 0.22 | 0.32 | 0.17 | 0.20 | 0.24 | 0.07 | 0.13 | 0.27 | 0.13 | 0.2 |
| 33 | 0.20 | 0.37 | 0.18 | 0.31 | 0.27 | 0.32 | 0.17 | 0.27 | 0.24 | 0.20 | 0.13 | 0.27 | 0.33 | 0.2 |
| 34 | 0.20 | 0.37 | 0.47 | 0.12 | 0.23 | 0.32 | 0.17 | 0.27 | 0.24 | 0.07 | 0.13 | 0.27 | 0.27 | 0.2 |
| 35 | 0.19 | 0.32 | 0.35 | 0.15 | 0.20 | 0.32 | 0.17 | 0.13 | 0.24 | 0.13 | 0.13 | 0.33 | 0.27 | 0.2 |
| 36 | 0.17 | 0.16 | 0.47 | 0.15 | 0.22 | 0.32 | 0.17 | 0.13 | 0.20 | 0.13 | 0.13 | 0.33 | 0.13 | 0.25 |
| 37 | 0.20 | 0.37 | 0.35 | 0.08 | 0.20 | 0.32 | 0.17 | 0.20 | 0.24 | 0.13 | 0.13 | 0.33 | 0.27 | 0.25 |
| 38 | 0.18 | 0.16 | 0.18 | 0.12 | 0.23 | 0.32 | 0.17 | 0.27 | 0.20 | 0.27 | 0.13 | 0.27 | 0.27 | 0.3 |
| 39 | 0.19 | 0.37 | 0.47 | 0.12 | 0.24 | 0.32 | 0.17 | 0.07 | 0.20 | 0.13 | 0.13 | 0.33 | 0.13 | 0.3 |
| 40 | 0.19 | 0.37 | 0.47 | 0.15 | 0.21 | 0.32 | 0.17 | 0.13 | 0.24 | 0.07 | 0.20 | 0.27 | 0.07 | 0.25 |
| 41 | 0.18 | 0.32 | 0.47 | 0.12 | 0.25 | 0.32 | 0.17 | 0.13 | 0.24 | 0.07 | 0.13 | 0.27 | 0.20 | 0.3 |
| 42 | 0.19 | 0.32 | 0.47 | 0.12 | 0.24 | 0.32 | 0.17 | 0.13 | 0.24 | 0.07 | 0.13 | 0.27 | 0.13 | 0.3 |
| 43 | 0.18 | 0.32 | 0.47 | 0.08 | 0.21 | 0.32 | 0.17 | 0.07 | 0.24 | 0.07 | 0.13 | 0.27 | 0.20 | 0.3 |
| 44 | 0.19 | 0.37 | 0.47 | 0.15 | 0.24 | 0.32 | 0.17 | 0.20 | 0.24 | 0.07 | 0.13 | 0.33 | 0.27 | 0.25 |
| 45 | 0.18 | 0.37 | 0.35 | 0.15 | 0.24 | 0.32 | 0.17 | 0.07 | 0.24 | 0.07 | 0.13 | 0.33 | 0.20 | 0.3 |
| 46 | 0.19 | 0.37 | 0.47 | 0.12 | 0.25 | 0.32 | 0.17 | 0.13 | 0.24 | 0.13 | 0.13 | 0.33 | 0.13 | 0.25 |
| 47 | 0.19 | 0.37 | 0.47 | 0.15 | 0.27 | 0.32 | 0.17 | 0.13 | 0.24 | 0.13 | 0.13 | 0.33 | 0.20 | 0.2 |
| 48 | 0.16 | 0.32 | 0.47 | 0.15 | 0.24 | 0.31 | 0.50 | 0.33 | 0.24 | 0.07 | 0.07 | 0.33 | 0.07 | 0.25 |
| 49 | 0.17 | 0.32 | 0.47 | 0.12 | 0.24 | 0.32 | 0.17 | 0.20 | 0.24 | 0.07 | 0.07 | 0.33 | 0.13 | 0.2 |
| 50 | 0.19 | 0.16 | 0.18 | 0.12 | 0.23 | 0.32 | 0.17 | 0.20 | 0.24 | 0.20 | 0.13 | 0.33 | 0.33 | 0.25 |
| 51 | 0.19 | 0.16 | 0.18 | 0.12 | 0.23 | 0.32 | 0.17 | 0.27 | 0.24 | 0.20 | 0.20 | 0.27 | 0.33 | 0.3 |
| 52 | 0.18 | 0.11 | 0.18 | 0.08 | 0.23 | 0.32 | 0.17 | 0.13 | 0.20 | 0.27 | 0.20 | 0.27 | 0.20 | 0.25 |
| 53 | 0.19 | 0.16 | 0.35 | 0.08 | 0.24 | 0.32 | 0.17 | 0.27 | 0.24 | 0.13 | 0.13 | 0.27 | 0.20 | 0.3 |
| 54 | 0.21 | 0.37 | 0.47 | 0.15 | 0.21 | 0.27 | 0.50 | 0.20 | 0.23 | 0.07 | 0.20 | 0.20 | 0.13 | 0.3 |
| 55 | 0.17 | 0.37 | 0.47 | 0.12 | 0.22 | 0.28 | 0.17 | 0.13 | 0.24 | 0.13 | 0.07 | 0.33 | 0.07 | 0.15 |
| 56 | 0.18 | 0.37 | 0.47 | 0.12 | 0.24 | 0.29 | 0.17 | 0.33 | 0.24 | 0.07 | 0.07 | 0.33 | 0.07 | 0.3 |

| | | | | | | | | | | | | | | |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 57 | 0.20 | 0.16 | 0.18 | 0.31 | 0.23 | 0.32 | 0.17 | 0.33 | 0.24 | 0.20 | 0.20 | 0.27 | 0.13 | 0.3 |
| 58 | 0.20 | 0.32 | 0.35 | 0.15 | 0.20 | 0.27 | 0.17 | 0.13 | 0.24 | 0.07 | 0.27 | 0.20 | 0.27 | 0.30 |
| 59 | 0.22 | 0.37 | 0.47 | 0.12 | 0.24 | 0.32 | 0.50 | 0.13 | 0.24 | 0.07 | 0.13 | 0.33 | 0.27 | 0.30 |
| 60 | 0.21 | 0.37 | 0.47 | 0.15 | 0.21 | 0.27 | 0.17 | 0.20 | 0.24 | 0.13 | 0.20 | 0.27 | 0.27 | 0.30 |

FHR- Forest health risk, MD- Mines to Distance, D-Drought, FD- Foliar dust ,LST- Land surface temperature, T- Temperature, DF- Deforestation ,TSD- Plant diversity, HS- Hot spot, N-NDVI , WS- Wind speed, FMT- Future Max Temperature, FDS - Future deforestation susceptibility, A- Altitude

Appendix 6: Field reflected NIR spectra level of sixty field sample points

| ID | NIR health level reflected spectra (0 to 1) | NIR moderate health level Reflected spectra (0 to 1) | NIR unhealthy level reflected Spectra (0 to 1) |
|----|---|--|--|
| 1 | 0.68 | 0.27 | 0.06 |
| 2 | 0.47 | 0.41 | 0.12 |
| 3 | 0.52 | 0.39 | 0.09 |
| 4 | 0.57 | 0.34 | 0.10 |
| 5 | 0.67 | 0.25 | 0.08 |
| 6 | 0.65 | 0.28 | 0.07 |
| 7 | 0.57 | 0.33 | 0.11 |
| 8 | 0.43 | 0.51 | 0.07 |
| 9 | 0.56 | 0.28 | 0.15 |
| 10 | 0.50 | 0.38 | 0.12 |
| 11 | 0.57 | 0.29 | 0.14 |
| 12 | 0.69 | 0.24 | 0.07 |
| 13 | 0.53 | 0.33 | 0.14 |
| 14 | 0.55 | 0.30 | 0.15 |
| 15 | 0.53 | 0.38 | 0.09 |
| 16 | 0.45 | 0.37 | 0.18 |
| 17 | 0.44 | 0.41 | 0.14 |
| 18 | 0.58 | 0.34 | 0.07 |
| 19 | 0.51 | 0.36 | 0.13 |
| 20 | 0.32 | 0.56 | 0.12 |
| 21 | 0.41 | 0.54 | 0.05 |
| 22 | 0.54 | 0.27 | 0.19 |
| 23 | 0.36 | 0.45 | 0.19 |
| 24 | 0.52 | 0.35 | 0.13 |
| 25 | 0.63 | 0.25 | 0.11 |
| 26 | 0.47 | 0.37 | 0.17 |
| 27 | 0.46 | 0.34 | 0.20 |
| 28 | 0.54 | 0.36 | 0.10 |
| 29 | 0.52 | 0.30 | 0.19 |

| | | | |
|----|------|------|------|
| 30 | 0.51 | 0.35 | 0.14 |
| 31 | 0.58 | 0.29 | 0.13 |
| 32 | 0.48 | 0.30 | 0.22 |
| 33 | 0.59 | 0.29 | 0.12 |
| 34 | 0.42 | 0.51 | 0.07 |
| 35 | 0.44 | 0.37 | 0.19 |
| 36 | 0.55 | 0.34 | 0.12 |
| 37 | 0.55 | 0.34 | 0.11 |
| 38 | 0.53 | 0.40 | 0.08 |
| 39 | 0.50 | 0.28 | 0.22 |
| 40 | 0.60 | 0.23 | 0.18 |
| 41 | 0.53 | 0.26 | 0.16 |
| 42 | 0.54 | 0.25 | 0.13 |
| 43 | 0.49 | 0.30 | 0.17 |
| 44 | 0.47 | 0.27 | 0.11 |
| 45 | 0.47 | 0.32 | 0.12 |
| 46 | 0.52 | 0.28 | 0.14 |
| 47 | 0.54 | 0.33 | 0.16 |
| 48 | 0.49 | 0.29 | 0.13 |
| 49 | 0.54 | 0.29 | 0.14 |
| 50 | 0.44 | 0.33 | 0.16 |
| 51 | 0.43 | 0.30 | 0.14 |
| 52 | 0.44 | 0.29 | 0.13 |
| 53 | 0.44 | 0.26 | 0.11 |
| 54 | 0.46 | 0.28 | 0.17 |
| 55 | 0.47 | 0.34 | 0.15 |
| 56 | 0.43 | 0.32 | 0.14 |
| 57 | 0.49 | 0.32 | 0.13 |
| 58 | 0.47 | 0.34 | 0.12 |
| 59 | 0.39 | 0.28 | 0.15 |
| 60 | 0.42 | 0.33 | 0.10 |

Appendix 7: FHR values of sixty field sample points derived from AHP model

| Samples ID | Lat | Long | FHR 2016 | FHR 2030 | FHR 2050 |
|------------|-------------------|-------------------|----------|----------|----------|
| 1 | 22° 11' 7.547" N | 85° 18' 53.585" E | 0.18 | 0.21 | 0.24 |
| 2 | 22° 11' 3.190" N | 85° 17' 52.008" E | 0.18 | 0.21 | 0.21 |
| 3 | 22° 11' 0.466" N | 85° 15' 31.495" E | 0.18 | 0.21 | 0.21 |
| 4 | 22° 9' 50.398" N | 85° 15' 44.382" E | 0.17 | 0.19 | 0.23 |
| 5 | 22° 10' 15.859" N | 85° 17' 13.565" E | 0.17 | 0.19 | 0.21 |
| 6 | 22° 9' 45.711" N | 85° 18' 7.404" E | 0.18 | 0.19 | 0.24 |
| 7 | 22° 8' 57.208" N | 85° 18' 26.233" E | 0.18 | 0.20 | 0.20 |
| 8 | 22° 8' 52.965" N | 85° 17' 42.328" E | 0.18 | 0.20 | 0.22 |
| 9 | 22° 9' 2.569" N | 85° 16' 33.876" E | 0.19 | 0.22 | 0.25 |
| 10 | 22° 9' 5.762" N | 85° 15' 5.924" E | 0.17 | 0.20 | 0.23 |
| 11 | 22° 8' 21.274" N | 85° 16' 1.137" E | 0.19 | 0.20 | 0.23 |
| 12 | 22° 7' 55.140" N | 85° 17' 7.937" E | 0.18 | 0.21 | 0.24 |

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| 13 | 22° 8' 5.082" N | 85° 18' 10.236" E | 0.19 | 0.22 | 0.25 |
| 14 | 22° 8' 8.451" N | 85° 18' 36.419" E | 0.18 | 0.22 | 0.23 |
| 15 | 22° 7' 48.857" N | 85° 14' 50.180" E | 0.21 | 0.22 | 0.24 |
| 16 | 22° 7' 28.664" N | 85° 14' 52.276" E | 0.20 | 0.21 | 0.22 |
| 17 | 22° 7' 35.036" N | 85° 15' 24.974" E | 0.20 | 0.22 | 0.25 |
| 18 | 22° 7' 5.717" N | 85° 14' 38.250" E | 0.19 | 0.19 | 0.22 |
| 19 | 22° 6' 49.724" N | 85° 15' 51.381" E | 0.20 | 0.22 | 0.26 |
| 20 | 22° 6' 38.287" N | 85° 15' 27.518" E | 0.20 | 0.22 | 0.23 |
| 21 | 22° 6' 20.939" N | 85° 15' 54.503" E | 0.19 | 0.22 | 0.22 |
| 22 | 22° 6' 53.668" N | 85° 16' 38.879" E | 0.20 | 0.25 | 0.28 |
| 23 | 22° 7' 17.546" N | 85° 16' 59.824" E | 0.19 | 0.23 | 0.25 |
| 24 | 22° 7' 24.669" N | 85° 17' 22.820" E | 0.20 | 0.23 | 0.26 |
| 25 | 22° 7' 35.960" N | 85° 18' 14.389" E | 0.19 | 0.23 | 0.26 |
| 26 | 22° 6' 57.650" N | 85° 18' 11.616" E | 0.19 | 0.22 | 0.25 |
| 27 | 22° 6' 58.603" N | 85° 17' 39.291" E | 0.18 | 0.22 | 0.27 |
| 28 | 22° 6' 35.138" N | 85° 17' 16.494" E | 0.20 | 0.22 | 0.28 |
| 29 | 22° 6' 3.525" N | 85° 16' 56.105" E | 0.23 | 0.25 | 0.27 |
| 30 | 22° 5' 53.453" N | 85° 16' 39.149" E | 0.21 | 0.23 | 0.27 |
| 31 | 22° 6' 14.725" N | 85° 14' 53.821" E | 0.20 | 0.20 | 0.23 |
| 32 | 22° 5' 28.594" N | 85° 14' 43.775" E | 0.18 | 0.19 | 0.22 |
| 33 | 22° 5' 38.930" N | 85° 15' 25.186" E | 0.20 | 0.23 | 0.26 |
| 34 | 22° 5' 44.658" N | 85° 15' 38.039" E | 0.20 | 0.22 | 0.25 |
| 35 | 22° 5' 0.902" N | 85° 15' 8.577" E | 0.19 | 0.22 | 0.24 |
| 36 | 22° 5' 4.376" N | 85° 14' 31.614" E | 0.17 | 0.19 | 0.21 |
| 37 | 22° 4' 37.327" N | 85° 15' 16.251" E | 0.20 | 0.24 | 0.26 |
| 38 | 22° 4' 0.058" N | 85° 14' 10.260" E | 0.18 | 0.20 | 0.21 |
| 39 | 22° 3' 36.820" N | 85° 14' 42.736" E | 0.19 | 0.21 | 0.22 |
| 40 | 22° 5' 45.513" N | 85° 16' 3.783" E | 0.19 | 0.19 | 0.23 |
| 41 | 22° 5' 27.034" N | 85° 16' 5.393" E | 0.18 | 0.21 | 0.25 |
| 42 | 22° 5' 11.195" N | 85° 16' 12.509" E | 0.19 | 0.20 | 0.24 |
| 43 | 22° 5' 1.103" N | 85° 15' 53.710" E | 0.18 | 0.22 | 0.25 |
| 44 | 22° 4' 33.109" N | 85° 15' 50.360" E | 0.19 | 0.23 | 0.23 |
| 45 | 22° 3' 38.451" N | 85° 15' 47.337" E | 0.18 | 0.20 | 0.23 |
| 46 | 22° 3' 25.021" N | 85° 15' 38.272" E | 0.19 | 0.20 | 0.23 |
| 47 | 22° 4' 5.019" N | 85° 14' 57.636" E | 0.19 | 0.23 | 0.25 |
| 48 | 22° 2' 54.556" N | 85° 15' 23.361" E | 0.16 | 0.19 | 0.21 |
| 49 | 22° 2' 54.824" N | 85° 15' 8.132" E | 0.17 | 0.20 | 0.20 |
| 50 | 22° 2' 30.231" N | 85° 14' 20.913" E | 0.19 | 0.21 | 0.26 |
| 51 | 22° 1' 53.747" N | 85° 13' 48.148" E | 0.19 | 0.21 | 0.22 |
| 52 | 22° 2' 31.508" N | 85° 13' 39.836" E | 0.18 | 0.19 | 0.21 |
| 53 | 22° 1' 37.144" N | 85° 14' 4.040" E | 0.19 | 0.20 | 0.23 |
| 54 | 22° 0' 46.446" N | 85° 14' 9.281" E | 0.21 | 0.22 | 0.20 |
| 55 | 22° 1' 39.790" N | 85° 14' 50.139" E | 0.17 | 0.19 | 0.22 |
| 56 | 22° 2' 3.250" N | 85° 15' 11.995" E | 0.18 | 0.20 | 0.22 |
| 57 | 22° 5' 31.349" N | 85° 16' 49.084" E | 0.20 | 0.20 | 0.26 |
| 58 | 22° 7' 49.848" N | 85° 16' 16.381" E | 0.20 | 0.21 | 0.24 |
| 59 | 22° 4' 23.461" N | 85° 15' 49.714" E | 0.22 | 0.24 | 0.25 |
| 60 | 22° 6' 44.404" N | 85° 16' 41.721" E | 0.21 | 0.25 | 0.27 |

