

Managing Water a Challenge in Cultivation of Horticultural Crops- A case study

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Introduction: Growing banana, a long duration crop in low rainfall area is a challenge. Adaption of drip irrigation and fertigation are imperative. Scheduling of fertigation and its effective distribution are key to success. Geomatics to measure within field variability of crop growth may be useful in guiding the planning of irrigation and fertilisers applications.

Objective: Capturing the within field variability in crop growth using remote sensing data.



Study area: Raver taluka, Jalgaon district, Maharashtra, India, a major banana growing district. Only 840mm annual rainfall in <50 rainy days mostly in June-September. Mean summer temperature 42.5^o C highest temp. 47.8^o C.

Data Used: Maximum value NDVI composite of 10-days (1-10, 11-20 and 21-last day of a month are Dekad 1, 2 & 3) from Sentinel-2 multi-spectral data. $NDVI = \frac{(NIR-RED)}{(NIR + Red)}$. Accessed from VEDAS system of Space Applications Centre, ISRO.

Data analysis: Individual field level temporal NDVI values extracted using VEDAS analysis system. Mean and 1SD values plotted for identified fields using MS excel SW. Related the NDVI value with field observations on inputs and crop growth.

Results: Banana with high NDVI, well separable from other crops. Field crops (Monsoon and Winter) show seasonal greening and browning. Peak NDVI for all 20 banana fields was 0.70-0.91 (Fig. 1a). Among 20 fields, 7 had 0 or very low SD (Fig.b), indicating uniform growth of banana crop; 5 moderate SD (Fig. d) and 8 high SD (Fig.c), indicating high non-uniformity in crop growth even in expert banana grower's field. Cloud cover hinders June-September observations.



Fig. a: Mean and standard deviation of 20 different sites (SDL= Lower SD and SDH= Higher SD) of NDVI at peak, planting date (PLD); b, c and d: Temporal NDVI- mean, SDL, SDH, Minimum and Maximum in each Dekad

Conclusions: Results show high potential for use of multi-spectral satellite images in detecting and monitoring within field variability in banana. June-September cloud free observations from multi-spectral satellite data is low, need to explore SAR data.

Way forward: Detailed analysis of field level observation on spatial variability in crop growth, yield and relate with satellite observations.