

DERIVING SUSTAINABLE SOLUTION FOR CARBON FINANCING USING DRONES

DroneAacharya is carrying out an aerial survey of 2,000 ha of crop area.



DRONES UTILISED IN:

- AGRICULTURE
- MEASURING CARBON POSITIVITY

IN A NUTSHELL

- 2,000 ha crop area to be surveyed and mapped
- Crop health to be mapped and analyzed through vegetation based indices
- Calculating carbon positivity of the agricultural fields

HOW DRONEACHARYA HELPED IN DERIVING RELIABLE SOLUTION FOR QUANTIFYING CARBON POSITIVITY FOR CARBON FINANCING

Maharashtra is a leading State in agriculture with over 60% of cultivable land under food grain crops. The state is also known as the pioneer in implementing farmer - friendly schemes in different sectors related to agriculture. One such initiative is to use the Carbon positivity of the farmers by implementing Disruptive Agricultural Techniques and quantify the carbon credits available for trading to reach carbon neutrality.

As per the Kyoto Protocol, developed countries have to reduce carbon emissions with sustainable developments. For achieving this, they can buy carbon credits from developing countries and trade their carbon negativity. Carbon financing is a tool by which carbon emissions are given a price.

The World Bank has created the World Bank Carbon Finance Unit (CFU) which uses money contributed by governments and companies in OECD countries to purchase project-based carbon credits in developing countries and countries with economies in transition.

THE CHALLENGE

Agriculture is a key pillar of Maharashtra economy but continues to be in trouble with structural drawbacks and developmental and financial limitations. With changing climate and unpredictable rainfall, farmers need dedicated efforts to make farming more profitable, inclusive and equitable. Trading of Carbon positivity of the farmers by means of carbon credits is one the ways to help the farmers. However, quantification/estimation of the available positive carbon credits is a difficult task and the precise methodology for the same has not been established yet. To explore the techniques for quantification of the Carbon positivity of farmers by using the Disruptive Technologies, efforts are being made by 2030 WRG with the support of its partners in Maharashtra. Similar to World Bank CFU, 2030 Water Resources Group (2030 WRG) is a global public-private-civil society platform conceived in the World Economic Forum in 2008 through the collaboration of a group of governments, multinational companies, multilateral agencies and international nongovernmental organisations. A Consortium for Carbon Financing and Disruptive Agricultural Technologies (C-CFDAT) has been formed to realise the efforts for quantification.



SOLUTION COMPARISON CHECKLIST

01

Human Centric

- Outdated
- Time consuming
- Manual error
- Non-Transparent
- Lack of evidence
- No verification

02

Satellite Based

- Advanced
- Procurement delays
- Cloud cover issues
- Field truthing is Necessary

03

DGPS Survey

- Human centric
- Time consuming
- Manual error
- Non-Transparent
- Lack of evidence
- No verification

04

Aerial Survey

- Advanced
- Fast and accurate
- Minimum manpower required
- Non-human centric
- Transparent
- Evidence based
- Verification enabled

THE SOLUTION

Being a technology partner in the C-CFDAT DroneAcharya provided drone services to support a Results Based Carbon Financing (RBCF) mechanism in conjunction with satellite imaging, ground-based sensors, a platform for data capture, and other disruptive agriculture technologies for climate resilience by mapping the area under pilot project of 2000 Hectares in Nandurbar District, Maharashtra. When it comes to capturing large amounts of detailed mapping data, leveraging drones makes the process exponentially faster & accurate. Using fixed wing drones carrying visual (RGB) sensors, the team acquired images with a ground resolution of 2 cm/pixel because it is the most efficient and economical solution. In addition to the aerial data capture, a field survey is also proposed by DroneAcharya to validate the data captured with precise information and accurate crop identification leading to realistic assessment of crop types and area.

THE RESULTS

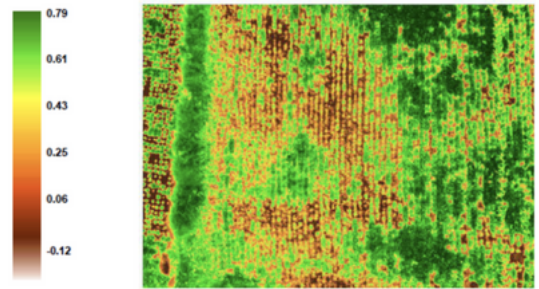
The pilot program will utilize the outcomes of drone mapping with Agronomists, Statisticians and different stakeholders. Based on the shared outcomes, through the use of financial proxies and approximations, carbon pricing for the area will be calculated.

Results of the drone survey will be submitted through different vegetation indices as follows:

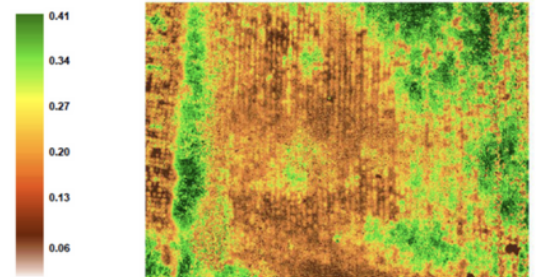
1. **Normalized Difference Vegetation Index (NDVI)** - For assessing the health of the vegetation.
2. **Canopy Chlorophyll Content Index (CCCI)** - For analysis of the amount of chlorophyll in vegetation, thereby allowing detection of nitrogen starvation before the damage is irreversible.
3. **Enhance Vegetation Index (EVI)** - For quantifying vegetation greenness.
4. **Leaf Area Index (LAI)** - As an important indicator of radiation and precipitation interception, energy conversion, water balance and reliable parameter for plant growth.
5. **Tree Count Analysis** - For sustaining conservational stability and ecological biodiversity.

Armed with the analysis of the crop health, mapping and estimating of carbon positivity and thereby deriving the carbon credit values, the farmers will be benefitted in terms of different subsidy schemes and other economical benefits.

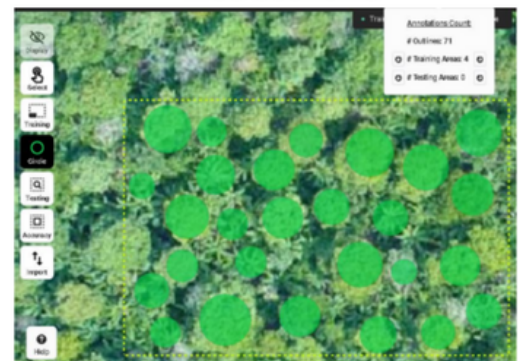
NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI)



CANOPY CHLOROPHYLL CONTENT INDEX (CCCI)



TREE COUNTING



KEY BENEFITS

1

Estimation of crop acreage under production

2

Crop stand, yield predictions and comparison with past seasons

3

Weather predictions, comparison, and corrective actions

4

Land use characteristics including soil type, gradient, texture, and Organic Carbon

5

Water resources data including distance to source, access, quality, and ET

6

Fertilizer inputs, nutrient loss, and emission estimates