Gully erosion mitigation using drone data

Section view of Urualla erosion site

Urualla community stakeholders
and Flying Labs staff

Stakeholders on the site to perform
sample drone flight

OVERVIEW

Flying Labs	Nigeria Flying Labs
Geographic area	Imo State and Abia State, Nigeria
Date	May 2021
Sector program	DevRobotics
Main SDGs	Goal 8: Decent Work and Economic Growth Goal 11: Sustainable Cities and Communities Goal 13: Climate Action

SCOPE

Project stakeholders	World Bank, Nigeria Erosion and Watershed Management Project (NEWMAP), Urualla Project committee and Aba Project committee
Who benefits	Local community
Challenges	The Nigeria Erosion and Watershed Management Project project aims to improve resilience and restore the land. Across Nigeria, a series of watershed management and climate resilience actions were implemented. The Urualla and Aba project committee had encountered difficulties in estimating the areas claimed by gully erosion and house damage, as well as getting recent images of the area of interest, and finally needed high-resolution images for processing and spatial analysis – volume, terrain, and slope estimates.
Scope	Within the project's scope, the team was tasked with: 1. Establishing community relations to facilitate ease of flight through community engagement. 2. Conducting drone flights to acquire very high-resolution aerial imagery of the area of interest. 3. Documented the local context and project progress with the NEWMAP teams.
Outcome	After engaging with the community, the team mapped the project area. The project area was mapped using an RGB sensor at a resolution of 3.5 cm/pixel using a double grid pattern and a minimum 70% overlap between images. The drone imagery was delivered in JPEG format through SiteScan.
Impact	Reducing the effect of erosion and establishing linkages and balance between economic, environmental, and social capital.

Next steps	Data processing will be carried out by the World Bank and evaluation of the project progress will be carried out using the processed images.

COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT	
Consent for data acquisition	A meeting was held with the Nigeria Erosion and Watershed Management Project (NEWMAP) staff members.
Activities to engage with the community	The Flying Labs team held a meeting with the Urualla King and major stakeholders of the community (Nigeria Erosion and Watershed Management Project).
Community groups engaged with	Nigeria Erosion and Watershed Management Project (NEWMAP) staff members, local community members.
Community attendance	25
Community feedback	'' We are happy that representatives are here to map the project and our hope is that this project is completed to stop the damages caused by the gully erosion in the community because a lot of houses has gone down the drain" - Mr Ethel (Urualla community) "People are being rendered homeless due to the expansion of the pond strengthened due to this rainy season, tunnels route are marked out for this project which claims people's houses all these are endured for a better and livable community, your presence to map gives us hope that this project is not stopping" - Community Project Secretary (Aba Community) "It's a great idea that will give a pictorial representation of the area and which gives room for questioning and analysis in order for prompt actions to be taken"
Stakeholder support	A representative from NEWMAP assisted with locating the project site.

DATA ACQUISITION	
Size of area	100 ha (1 sq km)
Drone	DJI Phantom 4
Sensor(s)	RGB, 20 MP
Flight plan software	Control+DJI and PIX4Dcapture
Flight height	100 meters (Imo) and 80 meters (Abia) above ground

GSD (Accuracy)	3.5 cm/pixel
Number of images acquired	1448
Number of flights	11
Time invested in data acquisition	5 days
Georeferencing	Onboard GPS

DATA PROCESSING & ANALYSIS	
Processing software	SiteScan (processing was done by the client)
Processing time	No data
Data products	Textured 3D model, orthomosaic
Analysis tools	-
Analysis outputs	-
Final outputs shared with stakeholders	Raw images, orthophotos
Data sharing	SiteScan