

# Displaying prediction with real optical images

```
# Supress Warnings
import warnings
warnings.filterwarnings('ignore')

import pandas as pd
# Import common GIS tools
import numpy as np
import xarray as xr
import matplotlib.pyplot as plt
import rasterio.features
import rioxarray as rio
import xrspatial.multiplespectral as ms

# Import Planetary Computer tools
import pystac_client
import planetary_computer as pc
import odc
from odc.stac import stac_load
from odc.algo import to_rgba
```

Storing the required variables(R,G,B) related to each latitude and longitude in a single list

```
import pandas as pd
import pystac_client

# Load the CSV file containing combined latitude and longitude values
df = pd.read_csv("Our prediction.csv")

# Define the time window
time_window = "2022-12-31"

# Initialize an empty list to store the results for each lat-long pair
result_list = []
# Define the pixel resolution for the final product
# Define the scale according to our selected crs, so we will use
degrees
resolution = 5 # meters per pixel
scale = resolution / 111320.0 # degrees per pixel for CRS:4326

# Iterate through each row in the DataFrame
for index, row in df.iterrows():
    # Extract latitude and longitude values from the 'Lat_Long' column
    lat_long_str = row['Latitude and Longitude']
    lat_long_str = lat_long_str.strip('()') # Remove parentheses
    lat_str, lon_str = lat_long_str.split(',') # Split into latitude
and longitude strings
```

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lat = float(lat_str)
lon = float(lon_str)

# Calculate the Lat-Lon bounding box region
box_size_deg = 0.04 # Surrounding box in degrees
min_lon = lon - box_size_deg / 2
min_lat = lat - box_size_deg / 2
max_lon = lon + box_size_deg / 2
max_lat = lat + box_size_deg / 2
bounds = (min_lon, min_lat, max_lon, max_lat)

# Open the STAC client and search for items
stac =
pystac_client.Client.open("https://planetarycomputer.microsoft.com/
api/stac/v1")
search = stac.search(collections=["sentinel-2-l2a"], bbox=bounds,
datetime=time_window)
items = list(search.get_all_items())
#print('This is the number of scenes that touch our
region:',len(items))

if items:
    # Load data for the current lat-long pair
    xx = stac_load(
        items,
        bands=["red", "green", "blue"],
        crs="EPSG:4326", # Latitude-Longitude
        resolution=scale, # Degrees
        chunks={"x": 2048, "y": 2048},
        dtype="uint16",
        patch_url=pc.sign,
        bbox=bounds
    )

    # Append the result to the list
    result_list.append(xx)
else:
    print(f"No items found for Lat: {lat}, Lon: {lon}")

# Now, result_list contains the data for each lat-long pair
# You can process this list further as needed

Plotting the rgb of each Latitude and longitude

import matplotlib.pyplot as plt

# Assuming you have another DataFrame 'other_df' with a column
'Title_Column'
# Iterate through each data array in result_list (assuming result_list
contains all xx arrays)

```

```

for index, data_array in enumerate(result_list):
    # Extract latitude and longitude values from the data_array
    lat = data_array.coords['latitude'].values[0]
    lon = data_array.coords['longitude'].values[0]

    # Create a plot for the red, green, and blue bands
    plot_data = data_array[["red", "green", "blue"]].to_array()

    # Get the title from 'other_df' based on the index
    if index < len(df):
        existing_title = df.loc[index, 'Prediction']
    else:
        existing_title = f"Title not available for index {index}"

    # Modify the title to include index and "Predicted"
    title = f" {index}.Predicted: {existing_title}"

    # Plot the data
    plot_data.plot.imshow(col='time', col_wrap=1, robust=True, vmin=0,
vmax=3000)

    # Set the title for the plot
    plt.title(title)

    # Add text annotations for latitude and longitude on the plot
    plt.text(0.02, 0.90, f"Lat: {lat:.2f}",
transform=plt.gca().transAxes, fontsize=10, color='white')
    plt.text(0.02, 0.80, f"Long: {lon:.2f}",
transform=plt.gca().transAxes, fontsize=10, color='white')

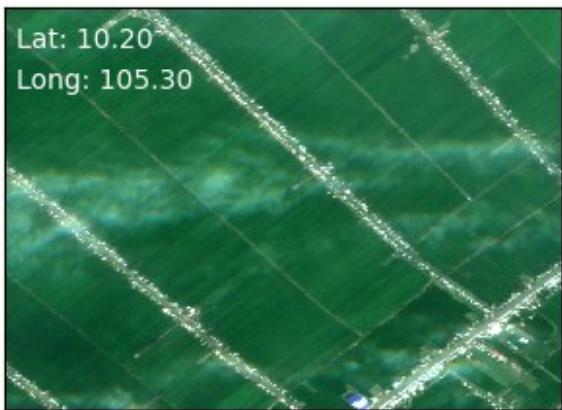
    # Remove latitude and longitude ticks on both the x and y axes
    plt.gca().set_xticks([])
    plt.gca().set_yticks([])

    # Remove x and y axis labels (titles)
    plt.gca().set_xlabel('')
    plt.gca().set_ylabel('')

    # Show the plot
    plt.show()

```

0.Predicted: Rice



1.Predicted: Rice



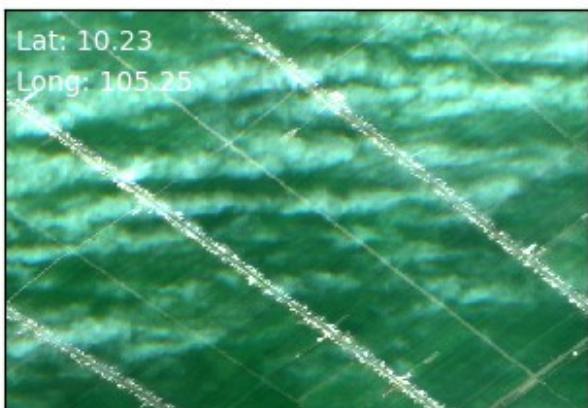
2.Predicted: Rice



**3.Predicted: Non Rice**



**4.Predicted: Rice**



**5.Predicted: Non Rice**



**6.Predicted: Non Rice**



**7.Predicted: Rice**



**8.Predicted: Non Rice**



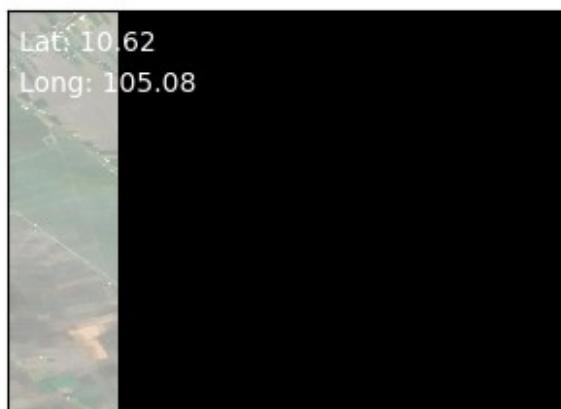
**9.Predicted: Non Rice**



**10.Predicted: Non Rice**



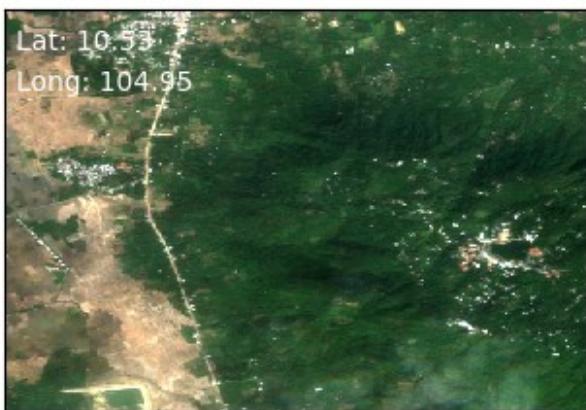
**11.Predicted: Non Rice**



**12.Predicted: Non Rice**



**13.Predicted: Non Rice**



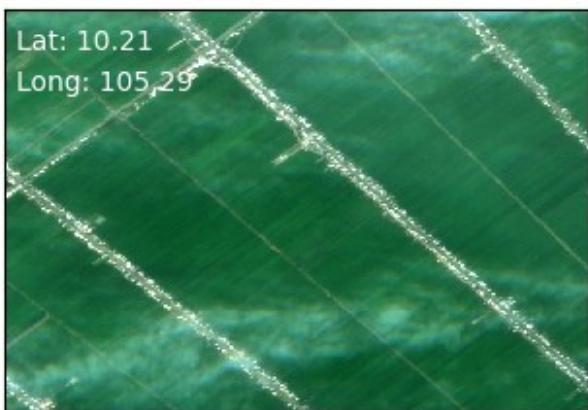
**14.Predicted: Non Rice**



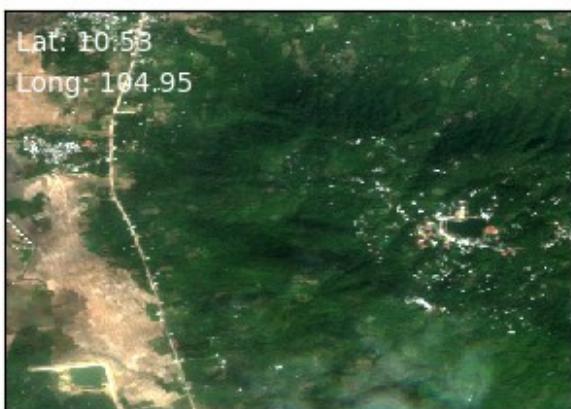
**15.Predicted: Non Rice**



**16.Predicted: Rice**



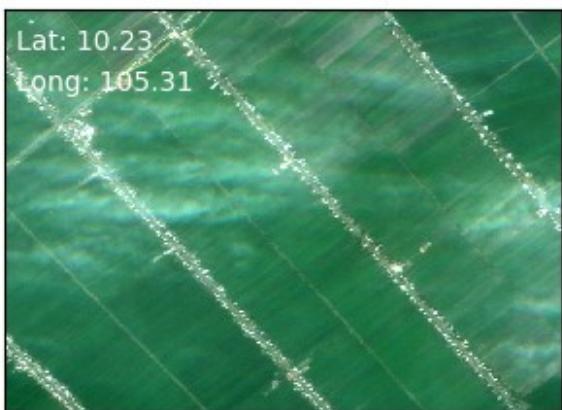
**17.Predicted: Non Rice**



**18.Predicted: Non Rice**



**19.Predicted: Rice**



**20.Predicted: Rice**



21.Predicted: Non Rice



22.Predicted: Rice



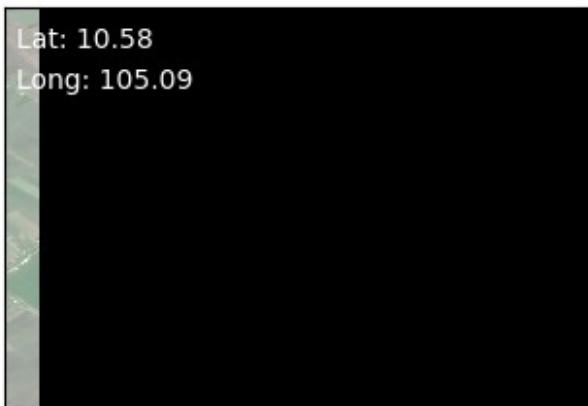
23.Predicted: Non Rice



24.Predicted: Rice



25.Predicted: Rice



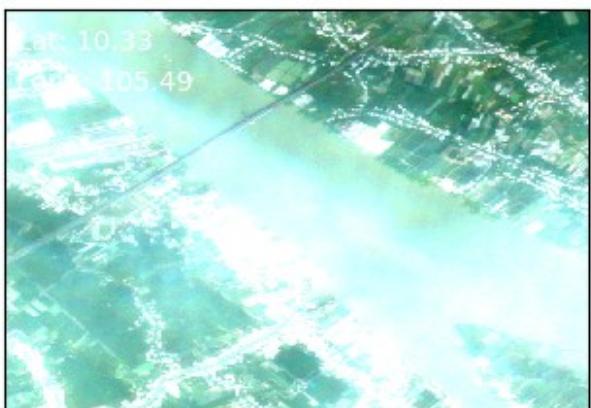
26.Predicted: Rice



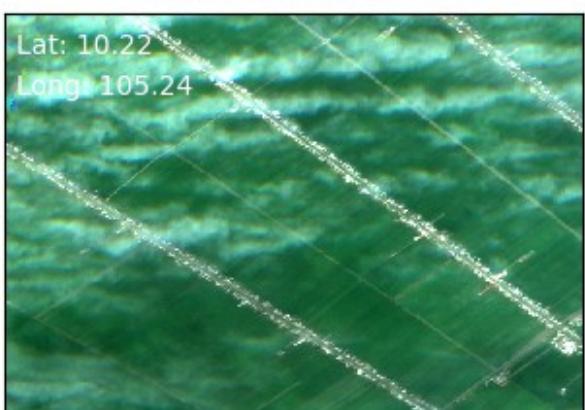
**27.Predicted: Non Rice**



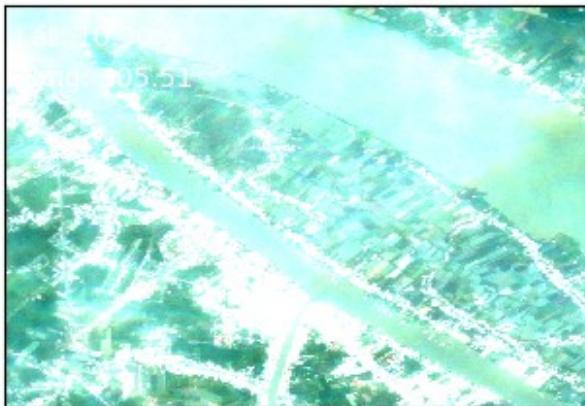
**28.Predicted: Non Rice**



**29.Predicted: Rice**



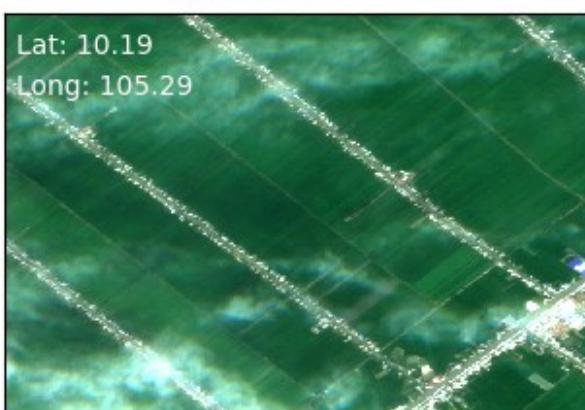
30.Predicted: Non Rice



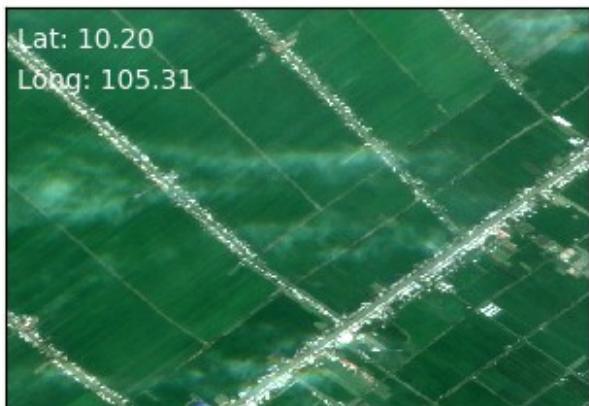
31.Predicted: Non Rice



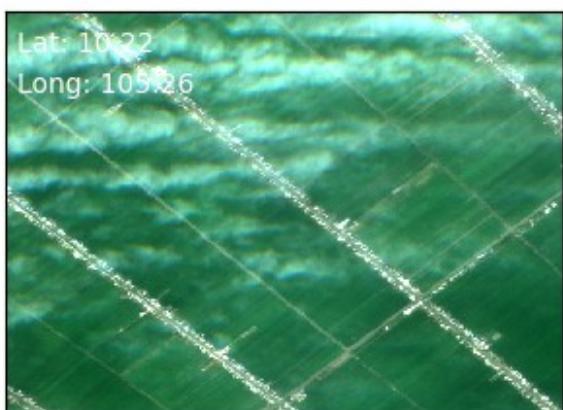
32.Predicted: Rice



33.Predicted: Rice



34.Predicted: Rice



35.Predicted: Rice



36.Predicted: Non Rice



37.Predicted: Non Rice



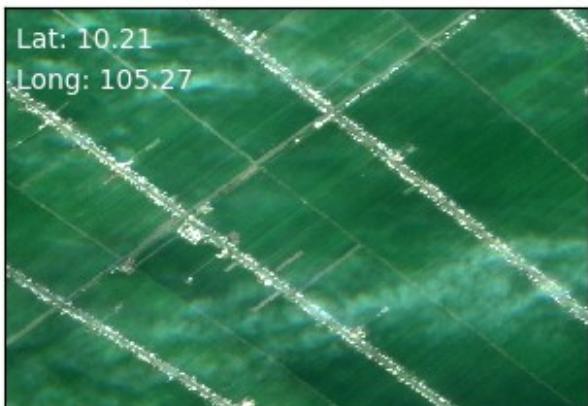
38.Predicted: Non Rice



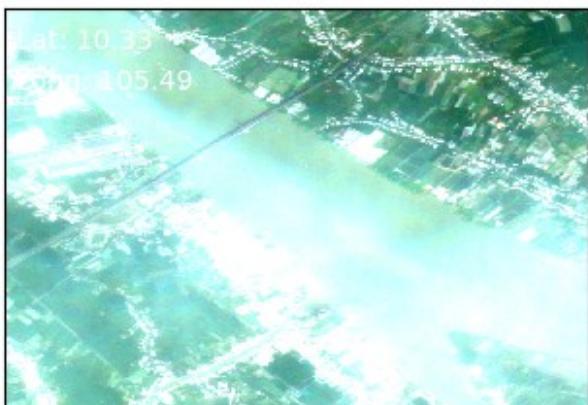
39.Predicted: Rice



40.Predicted: Rice



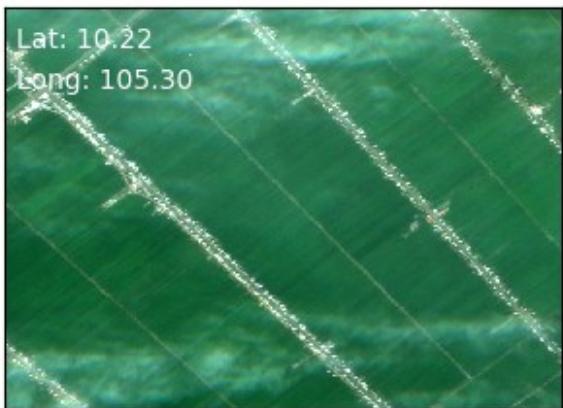
41.Predicted: Non Rice



42.Predicted: Non Rice



43.Predicted: Rice



44.Predicted: Non Rice



45.Predicted: Non Rice



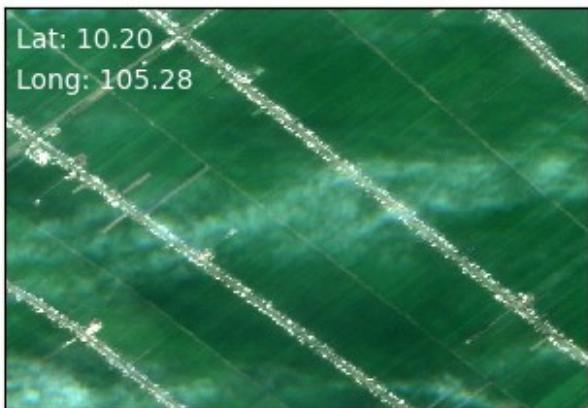
46.Predicted: Non Rice



47.Predicted: Non Rice



48.Predicted: Rice



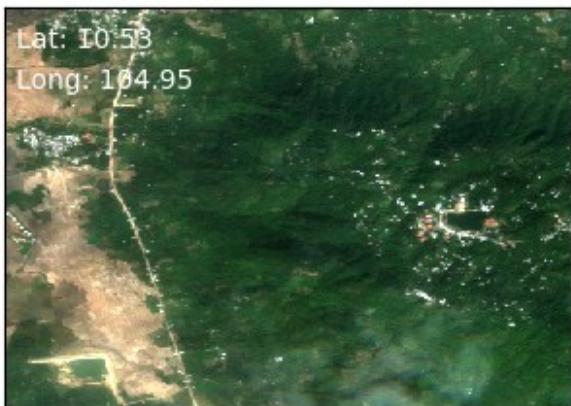
49.Predicted: Non Rice



50.Predicted: Non Rice



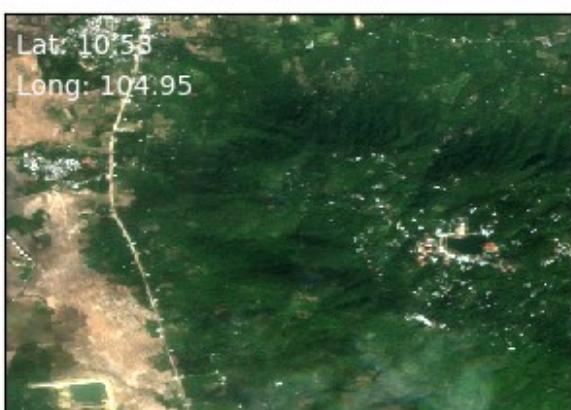
51.Predicted: Non Rice



52.Predicted: Non Rice



53.Predicted: Non Rice



**54.Predicted: Non Rice**



**55.Predicted: Non Rice**



**56.Predicted: Rice**



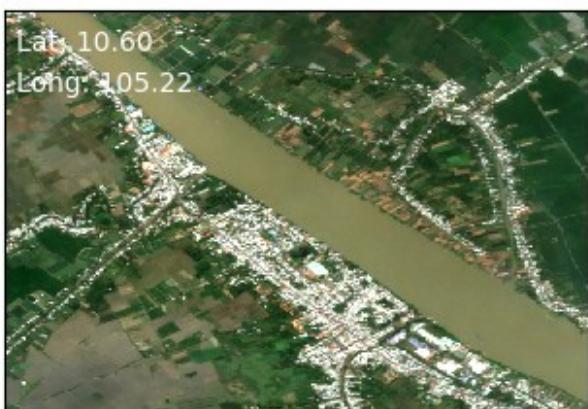
57.Predicted: Rice



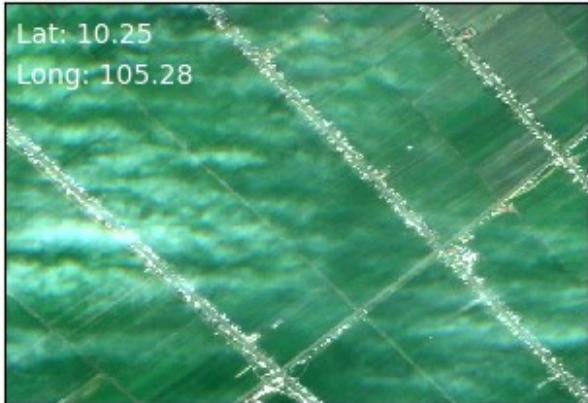
58.Predicted: Rice



59.Predicted: Non Rice



60.Predicted: Rice



61.Predicted: Rice



62.Predicted: Rice



**63.Predicted: Non Rice**



**64.Predicted: Non Rice**



**65.Predicted: Non Rice**



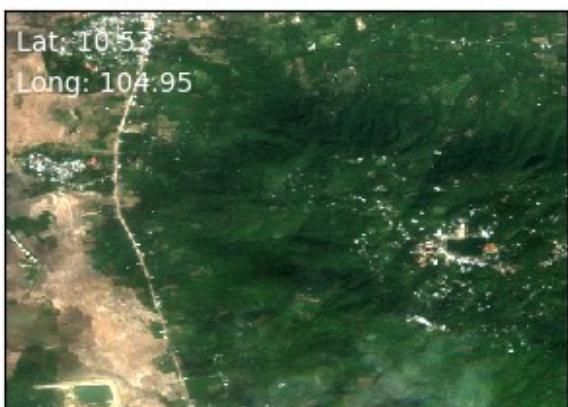
**66.Predicted: Non Rice**



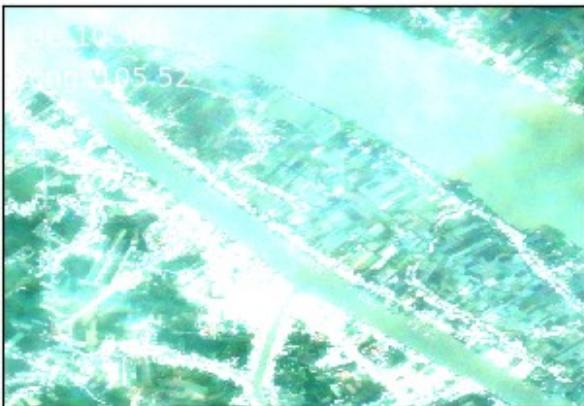
**67.Predicted: Rice**



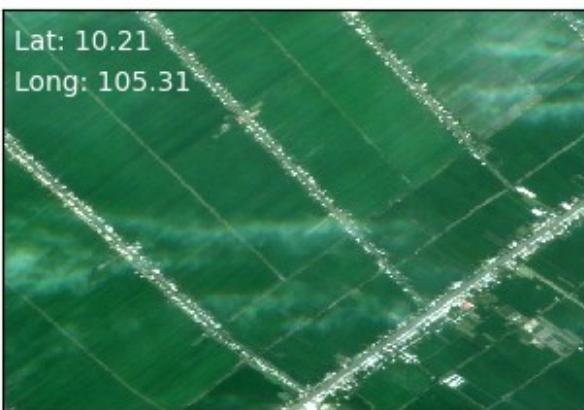
**68.Predicted: Non Rice**



**69.Predicted: Non Rice**



**70.Predicted: Rice**



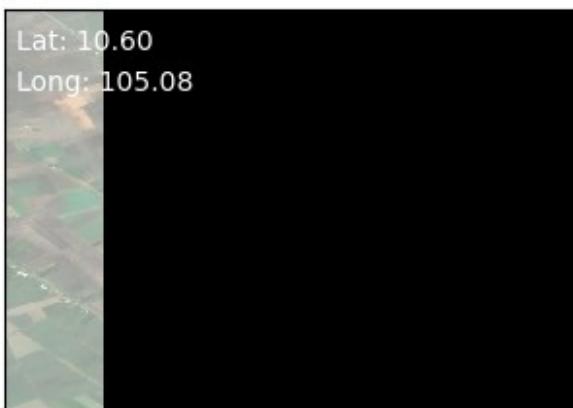
**71.Predicted: Non Rice**



72.Predicted: Non Rice



73.Predicted: Non Rice



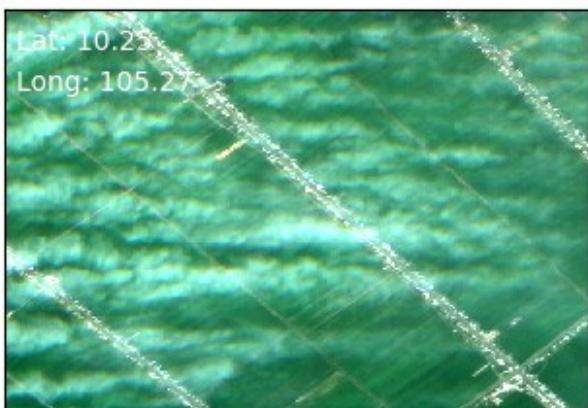
74.Predicted: Non Rice



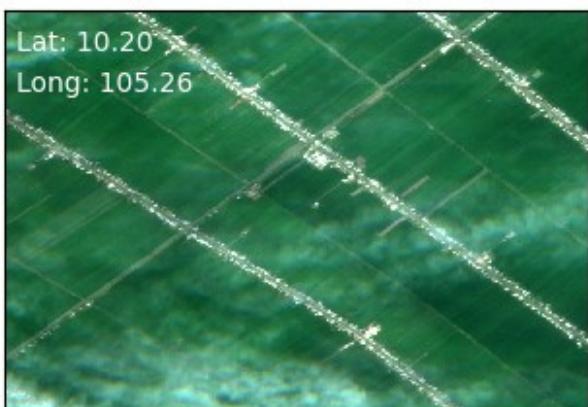
75.Predicted: Non Rice



76.Predicted: Rice



77.Predicted: Rice



78.Predicted: Non Rice



79.Predicted: Non Rice



80.Predicted: Non Rice



**81.Predicted: Non Rice**



**82.Predicted: Non Rice**



**83.Predicted: Non Rice**



84.Predicted: Rice



85.Predicted: Non Rice



86.Predicted: Non Rice



87.Predicted: Non Rice



88.Predicted: Non Rice



89.Predicted: Non Rice



**90.Predicted: Non Rice**



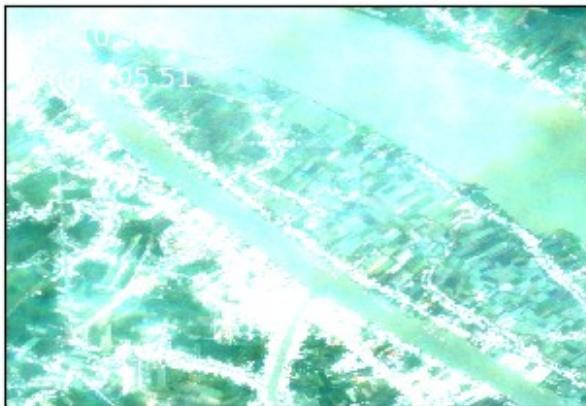
**91.Predicted: Non Rice**



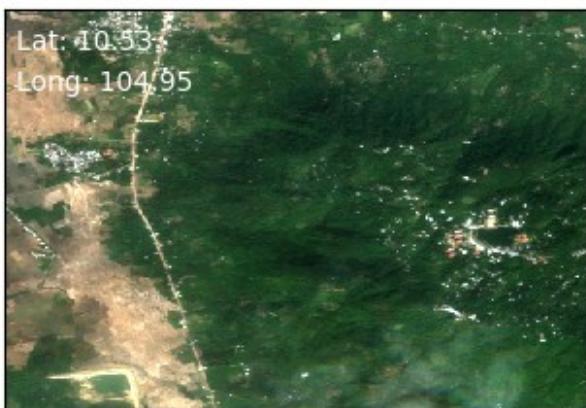
**92.Predicted: Non Rice**



**93.Predicted: Non Rice**



**94.Predicted: Non Rice**



**95.Predicted: Non Rice**



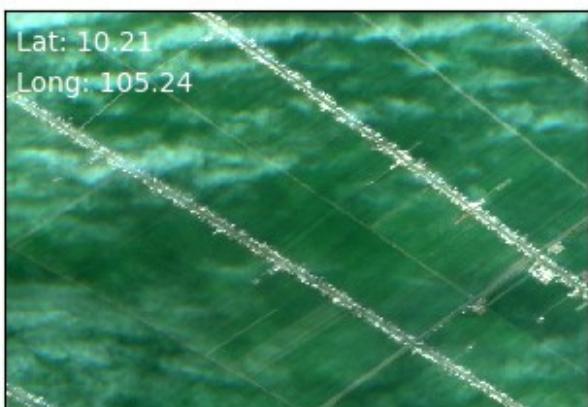
**96.Predicted: Rice**



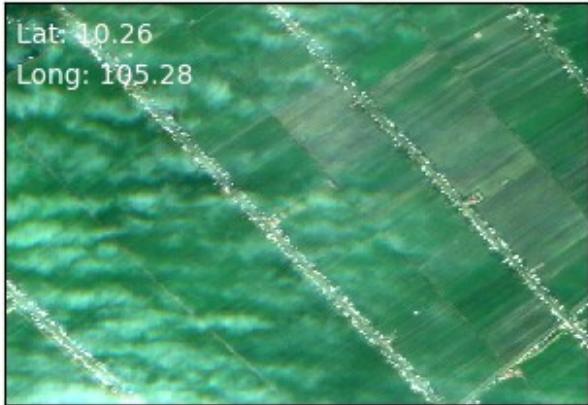
**97.Predicted: Non Rice**



**98.Predicted: Rice**



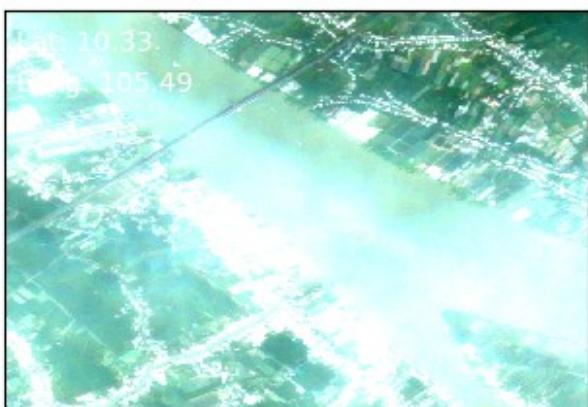
**99.Predicted: Rice**



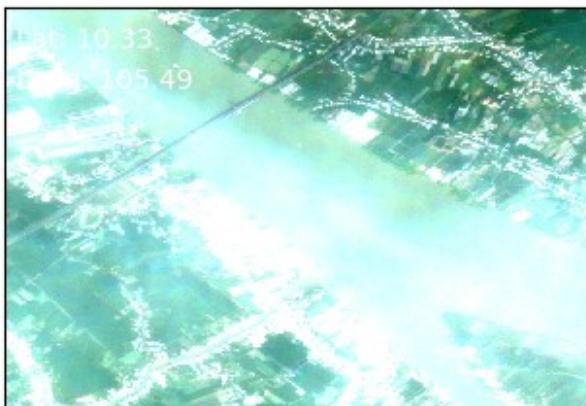
**100.Predicted: Non Rice**



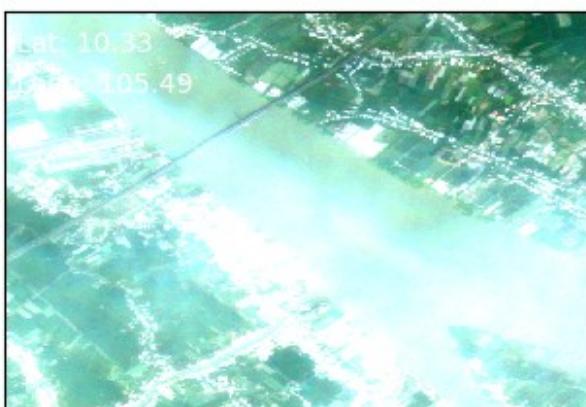
**101.Predicted: Non Rice**



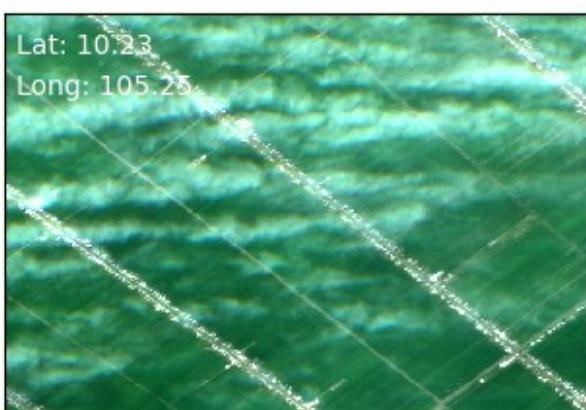
102.Predicted: Non Rice



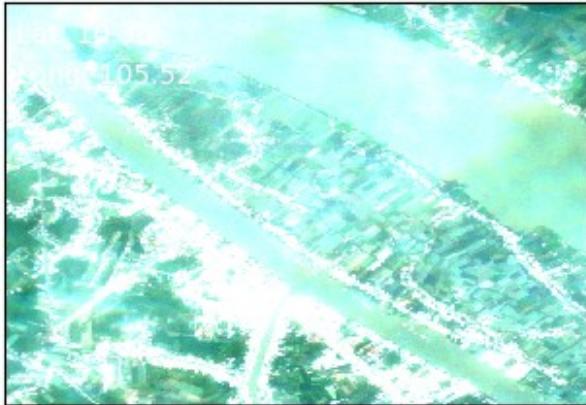
103.Predicted: Non Rice



104.Predicted: Rice



105.Predicted: Non Rice



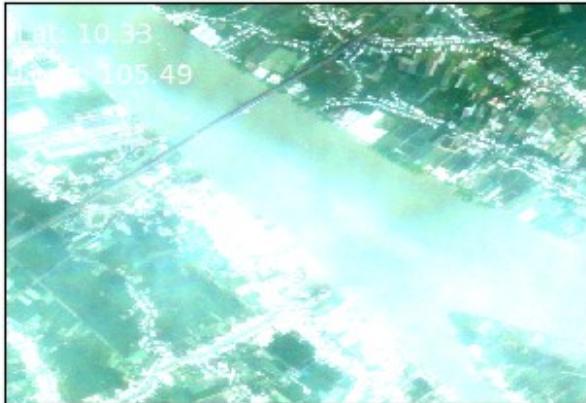
106.Predicted: Non Rice



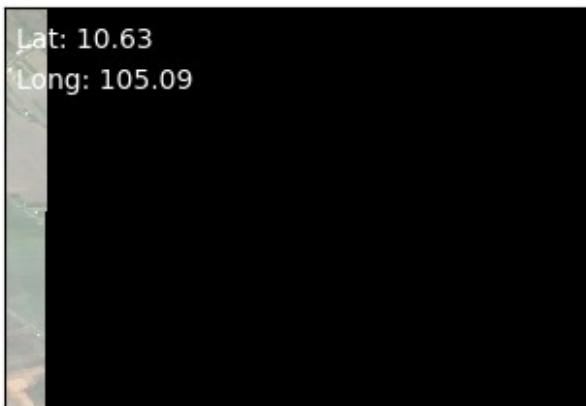
107.Predicted: Non Rice



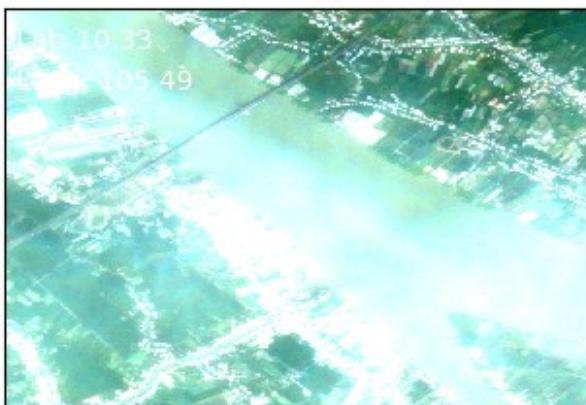
108.Predicted: Non Rice



109.Predicted: Non Rice



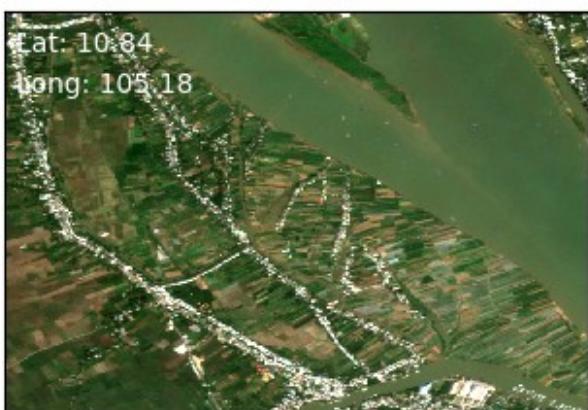
110.Predicted: Non Rice



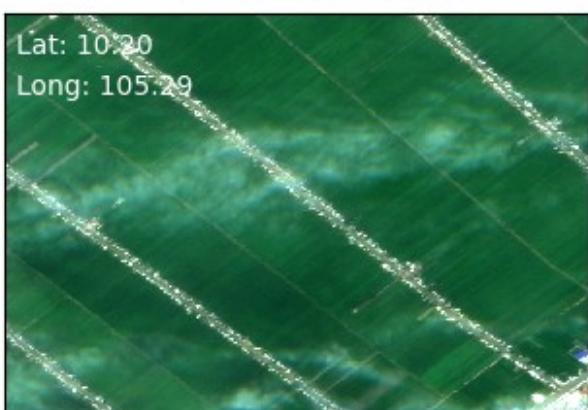
111.Predicted: Non Rice



112.Predicted: Non Rice



113.Predicted: Rice



**114.Predicted: Rice**



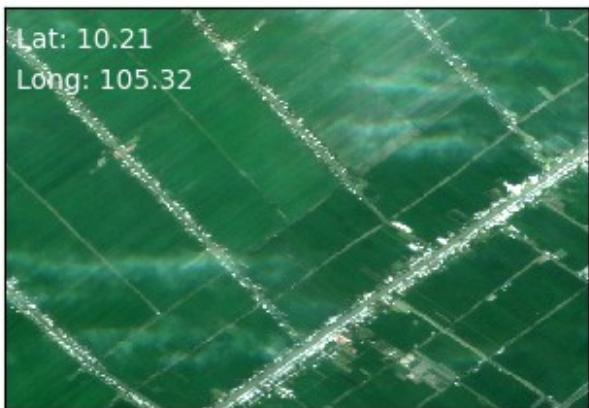
**115.Predicted: Non Rice**



**116.Predicted: Non Rice**



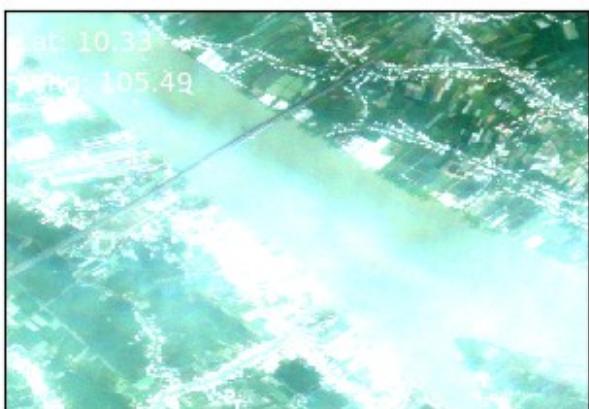
**117.Predicted: Rice**



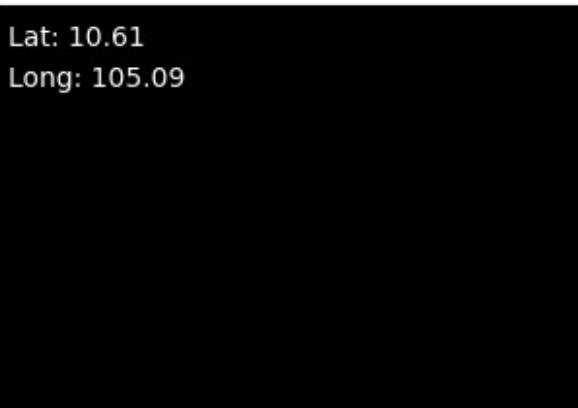
**118.Predicted: Non Rice**



**119.Predicted: Non Rice**



120.Predicted: Non Rice



121.Predicted: Non Rice



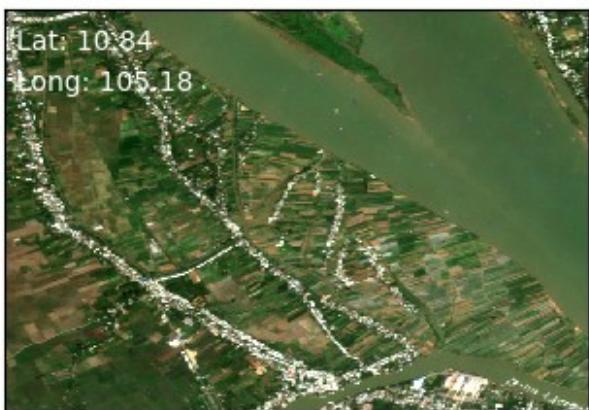
122.Predicted: Rice



123.Predicted: Rice



124.Predicted: Non Rice



125.Predicted: Non Rice



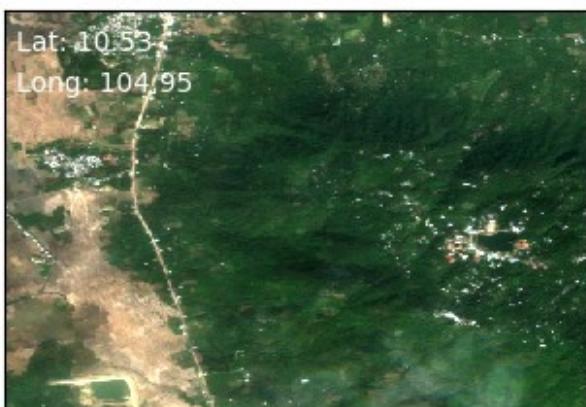
126.Predicted: Non Rice



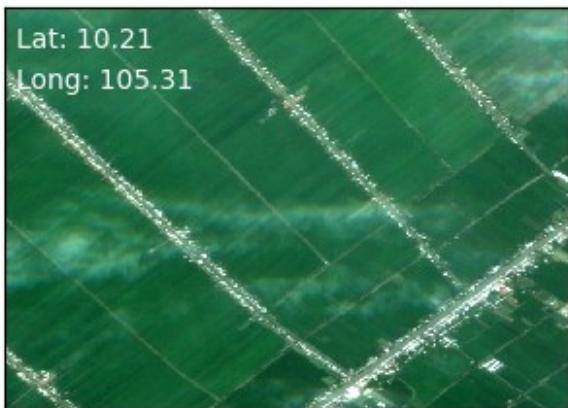
127.Predicted: Non Rice



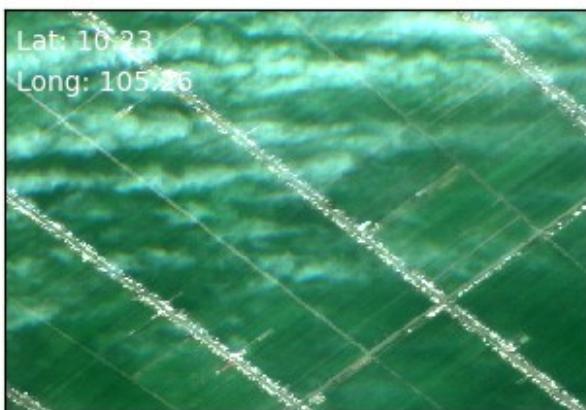
128.Predicted: Non Rice



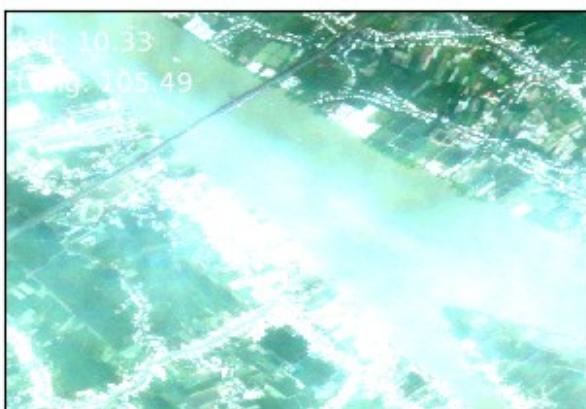
129.Predicted: Rice



130.Predicted: Rice



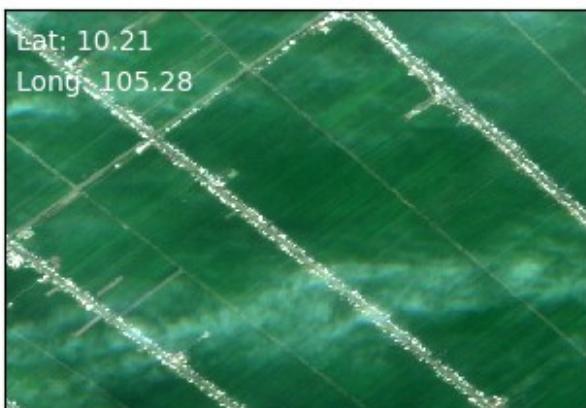
131.Predicted: Non Rice



132.Predicted: Non Rice



133.Predicted: Rice



134.Predicted: Non Rice



135.Predicted: Non Rice



136.Predicted: Rice



137.Predicted: Non Rice



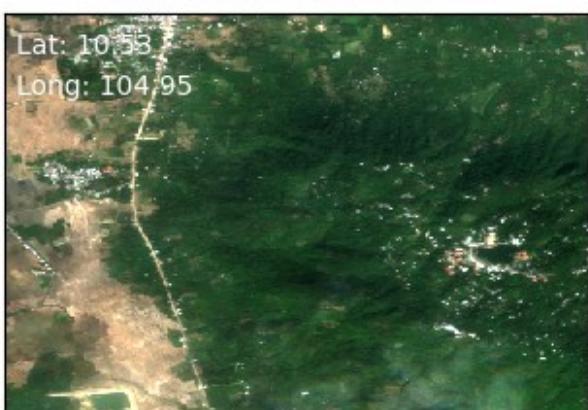
138.Predicted: Non Rice



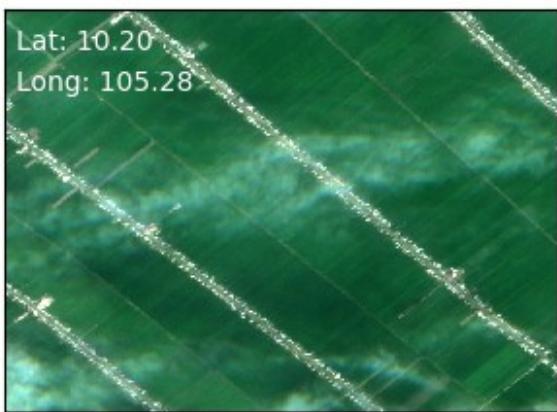
139.Predicted: Non Rice



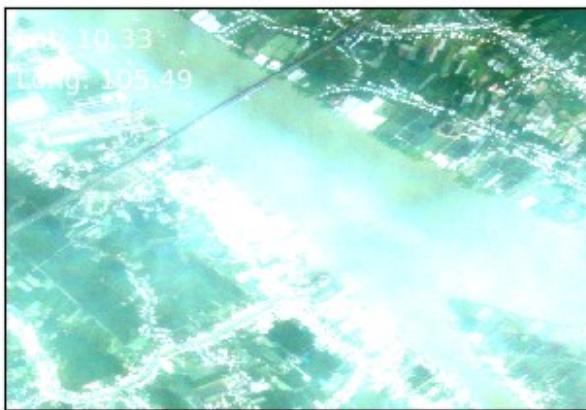
140.Predicted: Non Rice



141.Predicted: Rice



142.Predicted: Non Rice



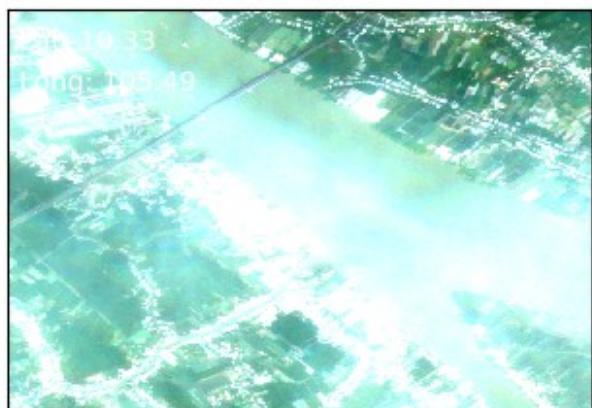
143.Predicted: Non Rice



**144.Predicted: Rice**



**145.Predicted: Non Rice**



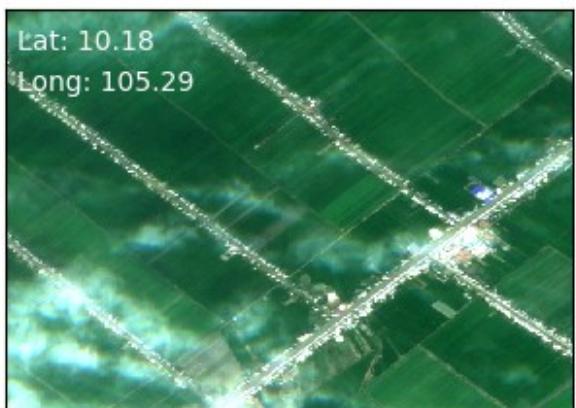
**146.Predicted: Non Rice**



147.Predicted: Rice



148.Predicted: Rice



149.Predicted: Non Rice



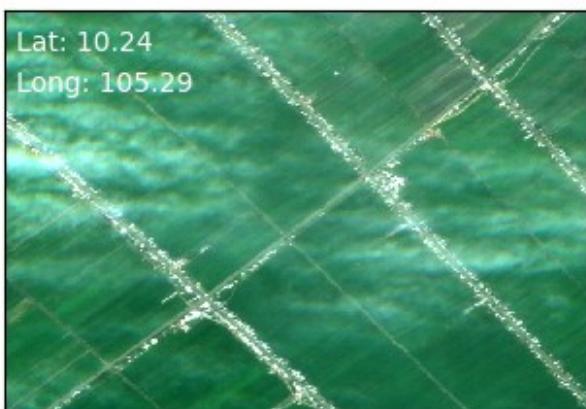
150.Predicted: Non Rice



151.Predicted: Non Rice



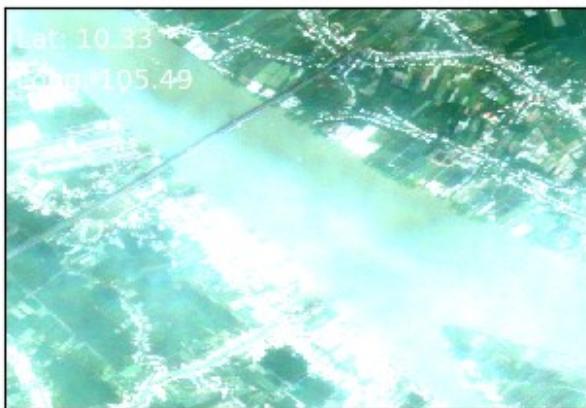
152.Predicted: Rice



153.Predicted: Non Rice



154.Predicted: Non Rice



155.Predicted: Rice



156.Predicted: Non Rice



157.Predicted: Rice



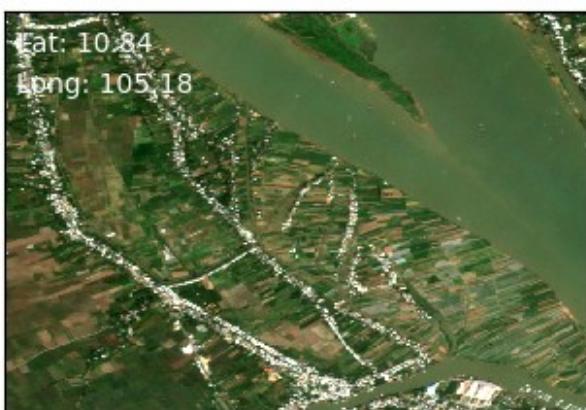
158.Predicted: Non Rice



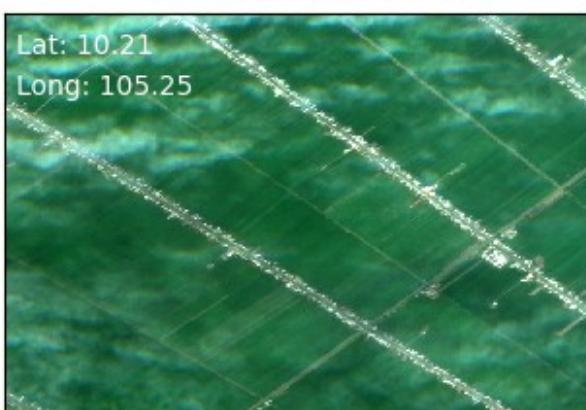
159.Predicted: Non Rice



160.Predicted: Non Rice



161.Predicted: Rice



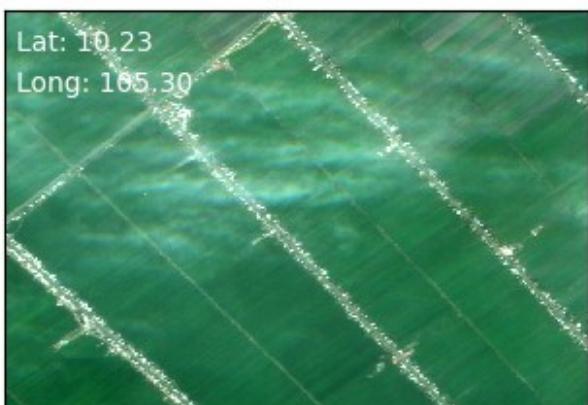
162.Predicted: Non Rice



163.Predicted: Non Rice



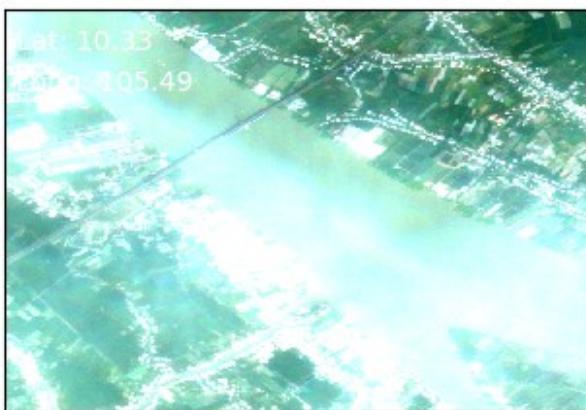
164.Predicted: Rice



**165.Predicted: Non Rice**



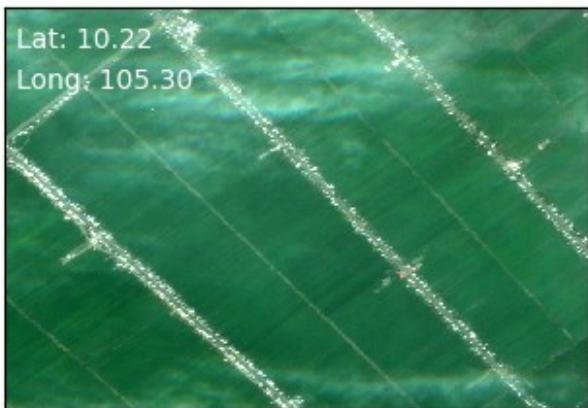
**166.Predicted: Non Rice**



**167.Predicted: Non Rice**



168.Predicted: Rice



169.Predicted: Non Rice



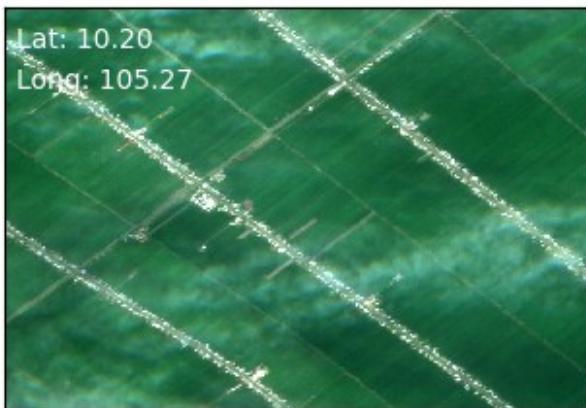
170.Predicted: Non Rice



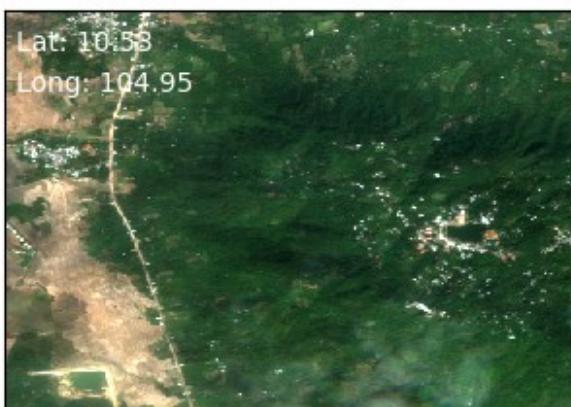
171.Predicted: Non Rice



172.Predicted: Rice



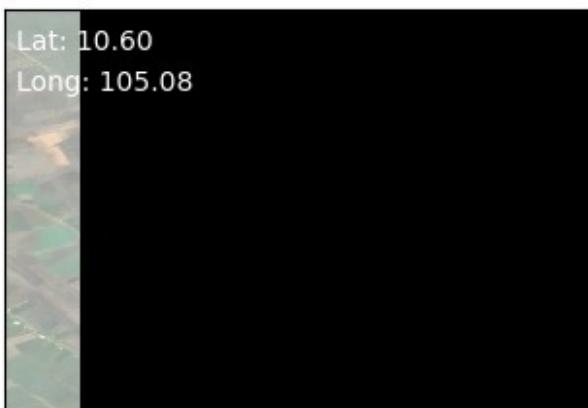
173.Predicted: Non Rice



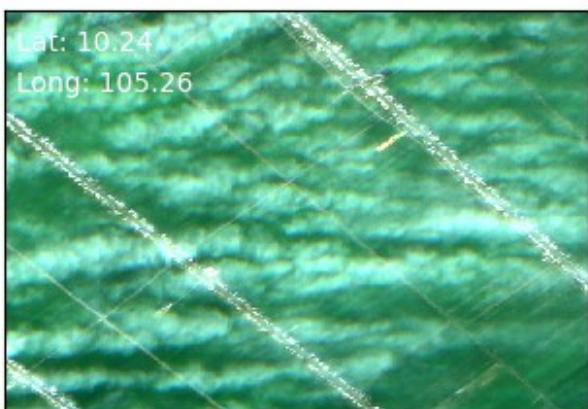
174.Predicted: Non Rice



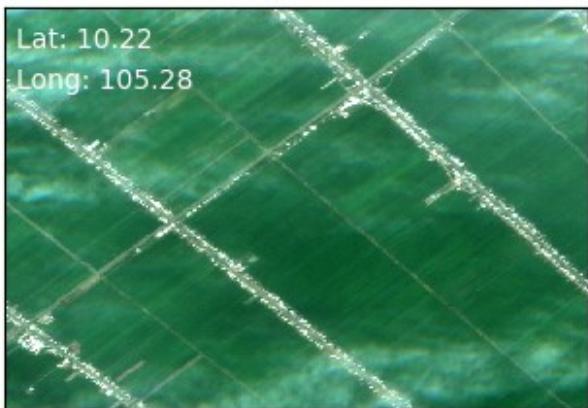
175.Predicted: Rice



176.Predicted: Rice



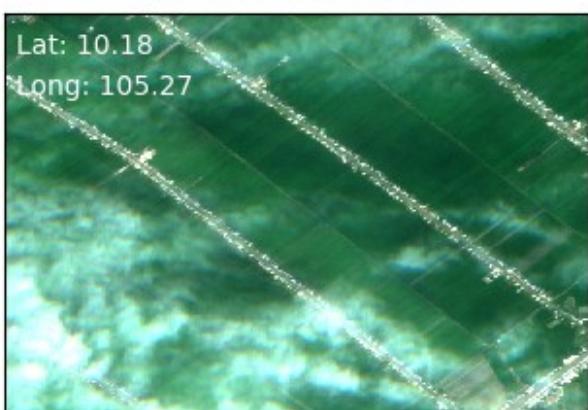
177.Predicted: Rice



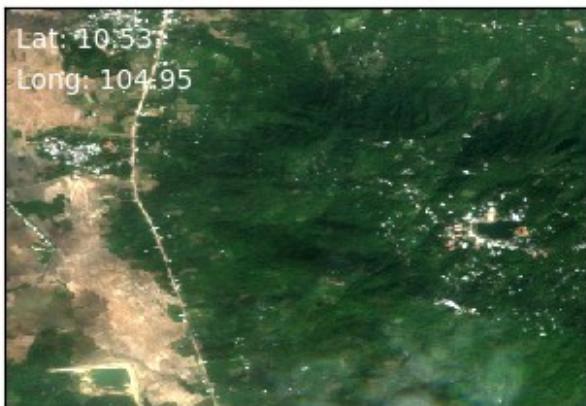
178.Predicted: Non Rice



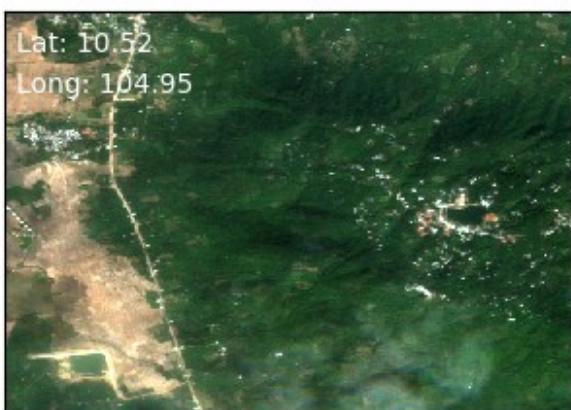
179.Predicted: Rice



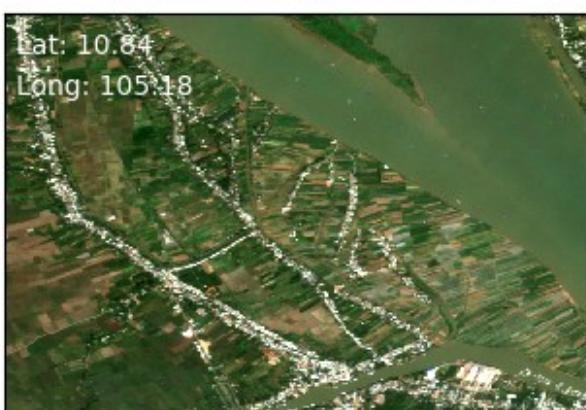
180.Predicted: Non Rice



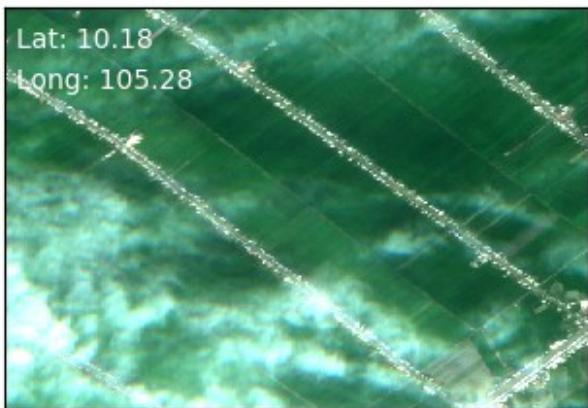
181.Predicted: Non Rice



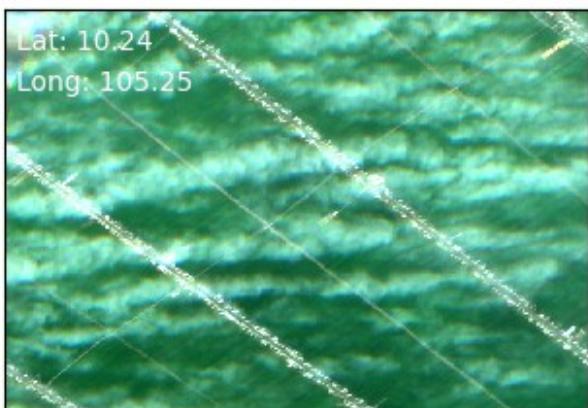
182.Predicted: Non Rice



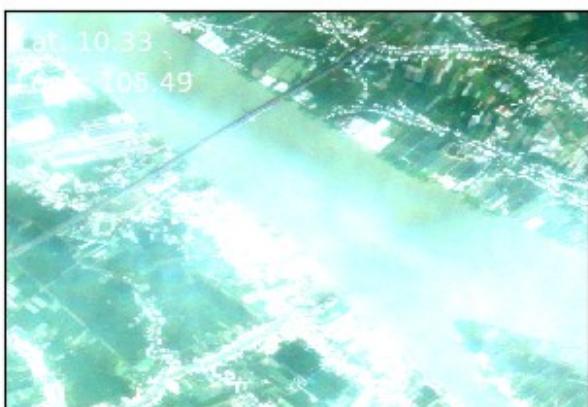
**183.Predicted: Rice**



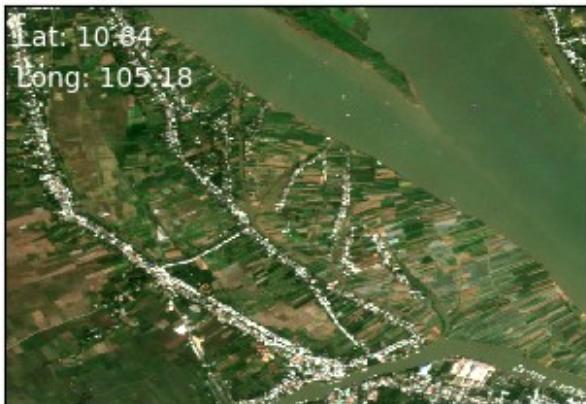
**184.Predicted: Rice**



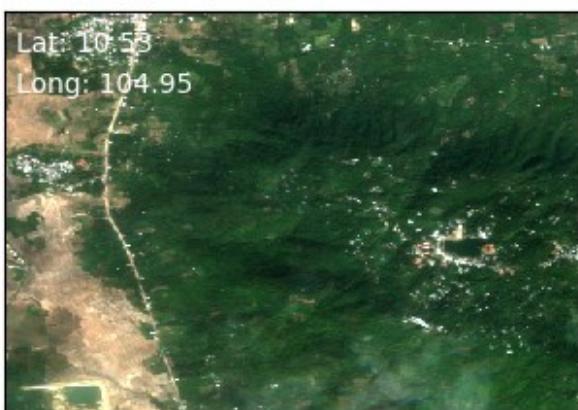
**185.Predicted: Non Rice**



186.Predicted: Non Rice



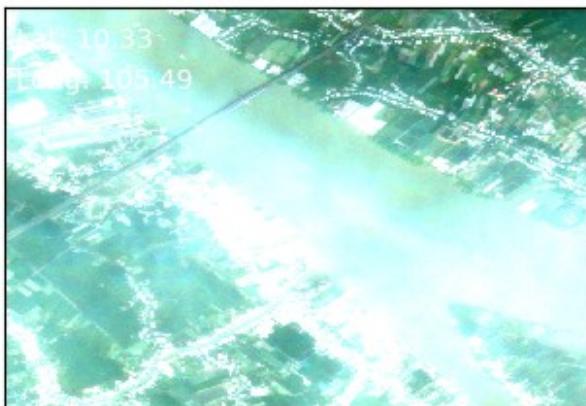
187.Predicted: Non Rice



188.Predicted: Non Rice



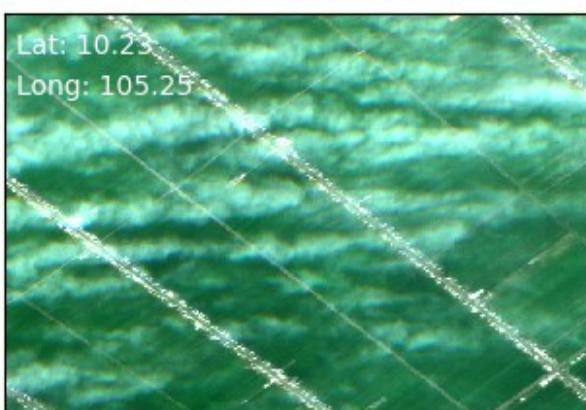
189.Predicted: Non Rice



190.Predicted: Non Rice



191.Predicted: Rice



**192.Predicted: Non Rice**



**193.Predicted: Non Rice**



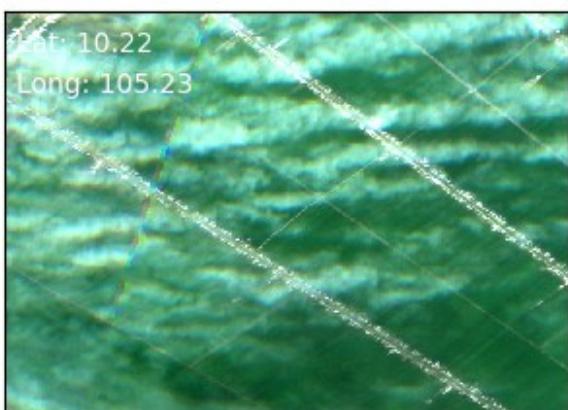
**194.Predicted: Rice**



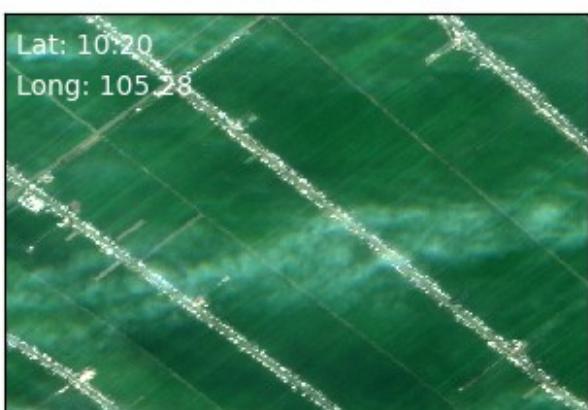
**195.Predicted: Non Rice**



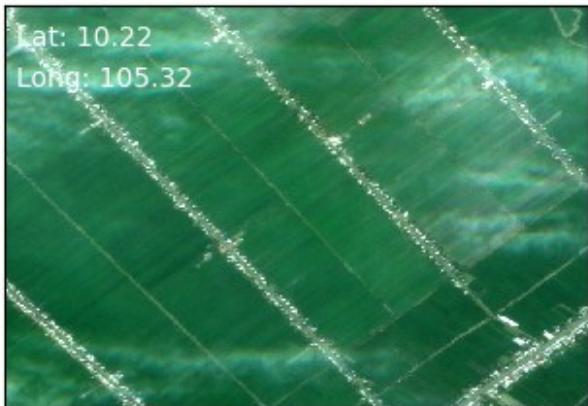
**196.Predicted: Rice**



**197.Predicted: Rice**



198.Predicted: Rice



199.Predicted: Non Rice



200.Predicted: Non Rice



201.Predicted: Non Rice



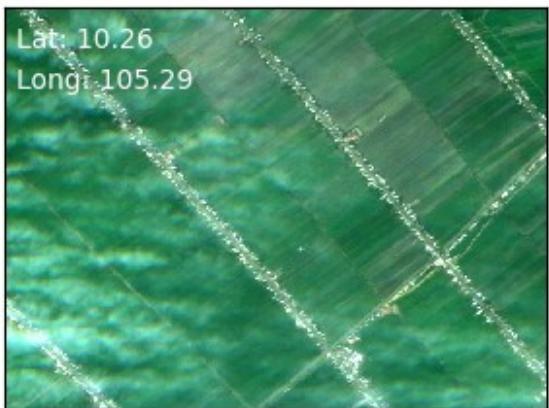
202.Predicted: Non Rice



203.Predicted: Non Rice



204.Predicted: Rice



205.Predicted: Non Rice



206.Predicted: Non Rice



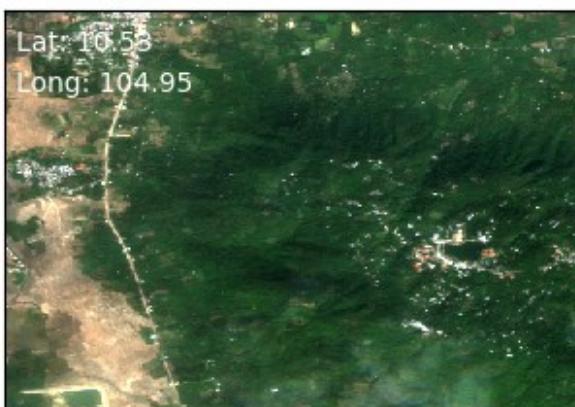
207.Predicted: Non Rice



208.Predicted: Non Rice



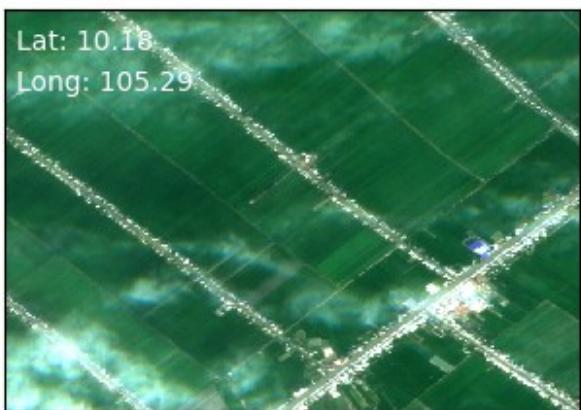
209.Predicted: Non Rice



210.Predicted: Non Rice



211.Predicted: Rice



212.Predicted: Rice



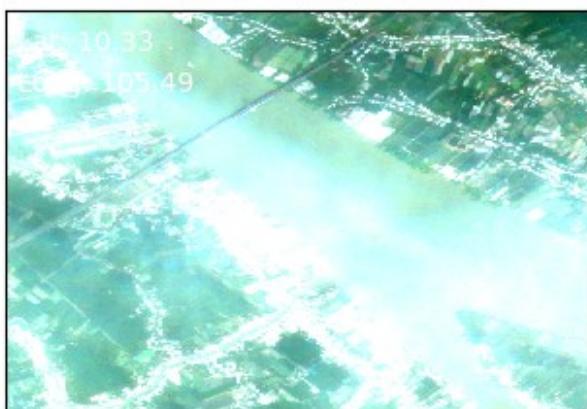
213.Predicted: Rice



214.Predicted: Rice



215.Predicted: Non Rice



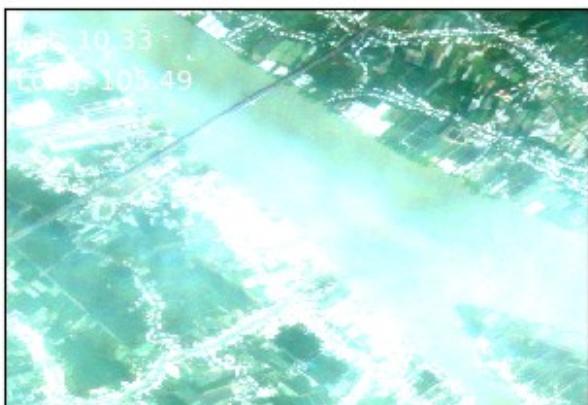
216.Predicted: Non Rice



217.Predicted: Rice



218.Predicted: Non Rice



219.Predicted: Rice



220.Predicted: Non Rice



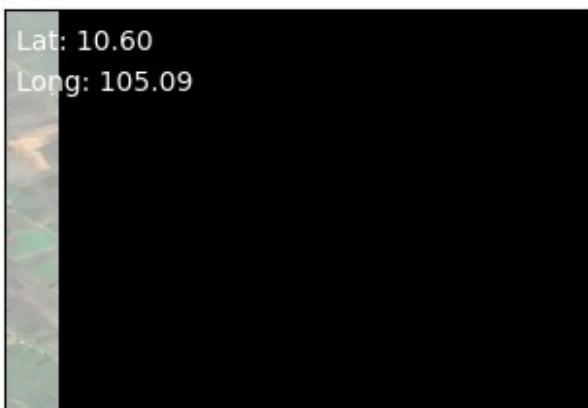
221.Predicted: Non Rice



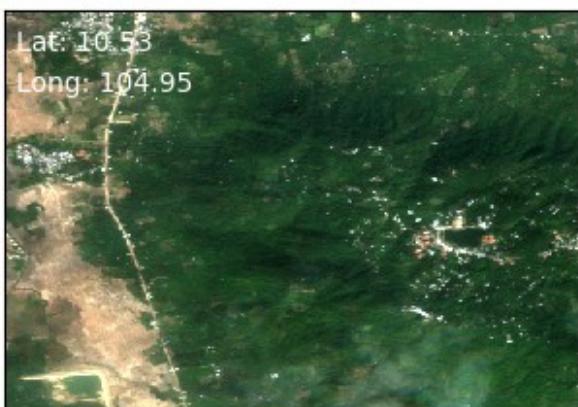
222.Predicted: Non Rice



223.Predicted: Rice



224.Predicted: Non Rice



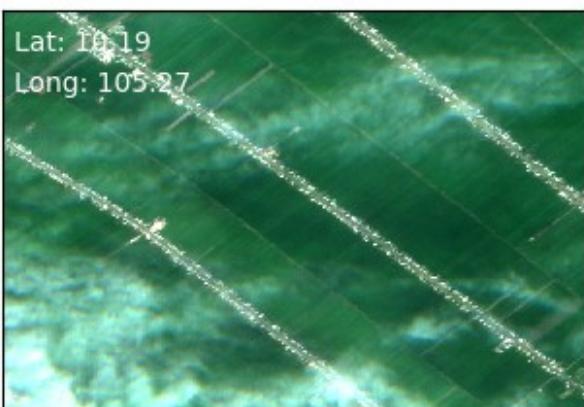
225.Predicted: Non Rice



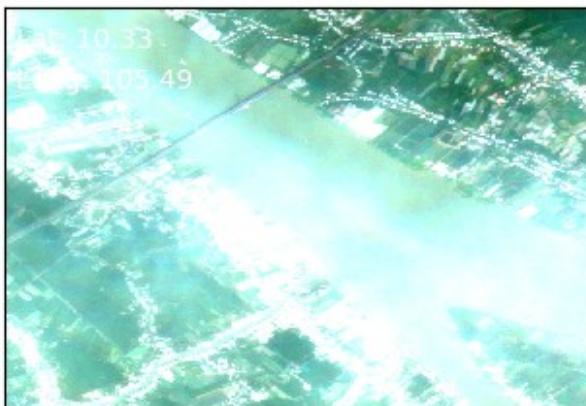
226.Predicted: Non Rice



227.Predicted: Rice



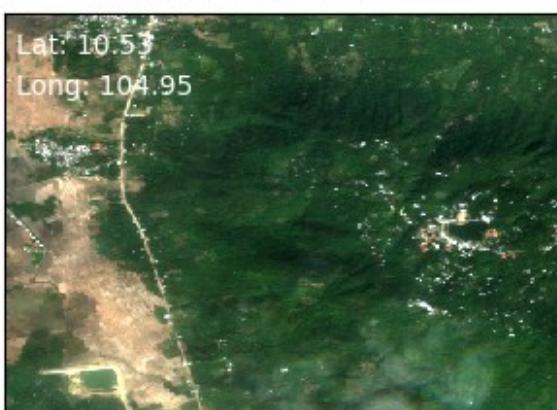
228.Predicted: Non Rice



229.Predicted: Non Rice



230.Predicted: Non Rice



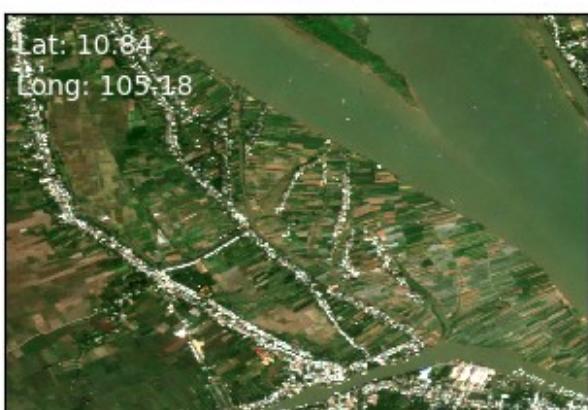
231.Predicted: Non Rice



232.Predicted: Non Rice



233.Predicted: Non Rice



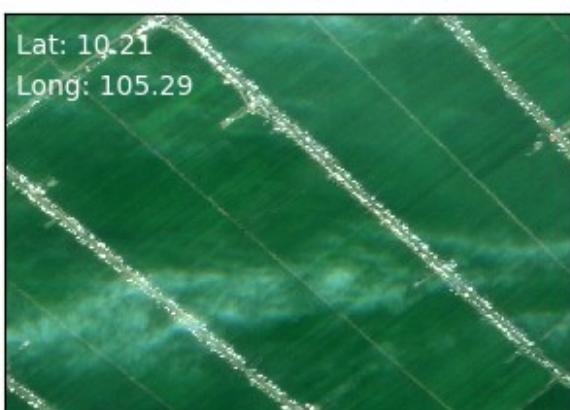
234.Predicted: Non Rice



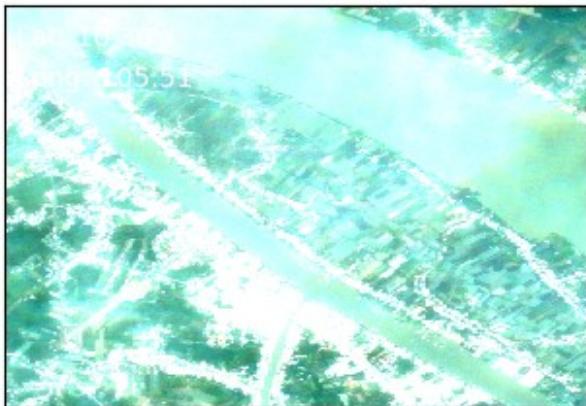
235.Predicted: Non Rice



236.Predicted: Rice



237.Predicted: Non Rice



238.Predicted: Non Rice



239.Predicted: Rice



240.Predicted: Non Rice



241.Predicted: Rice



242.Predicted: Rice



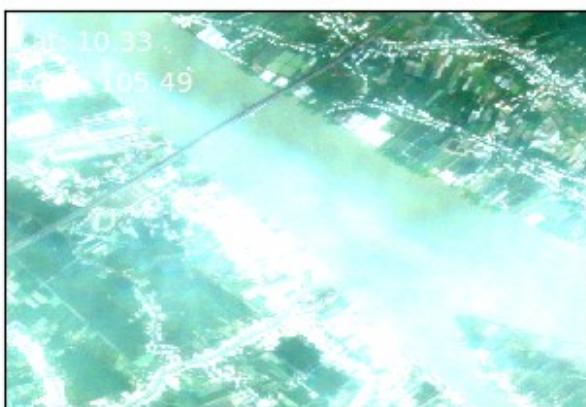
243.Predicted: Non Rice



244.Predicted: Non Rice



245.Predicted: Non Rice



246.Predicted: Non Rice



247.Predicted: Non Rice



248.Predicted: Rice



249.Predicted: Non Rice



Lat: 10.59

Long: 105.08

