

Watchdog began on the day of the Easter Sunday Attack, 2019.

We began as volunteer fact-checking effort and reached 200k active users in Sri Lanka within months.

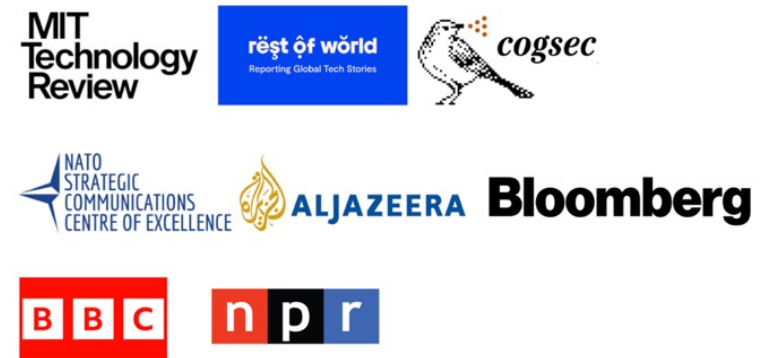
Over time, we evolved into an open-source research collective.

We have a history of doing interesting (and sometimes strange) multidisciplinary work.

#### OUR FUNDERS / PARTNERS



#### OUR WORK GOT FEATURED ON



Analysis

# Oddamavadi: no rest for the dead

Aug 29, 2022

Contributors

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Mohamed Faris Kesavan Selvarajah Nishadi Gunatilake



Two years ago, the government passed a compulsory cremation policy for those who died of COVID-19, with no clear reason for it other than xenophobia. After months of campaigning and pressure both locally and internationally, the gazette on the subject was revoked. Instead, families had to bury their dead in a far-flung village in the East, and supply funds and labour - despite the government sitting on billions raised by the Itukama fund.



A police officer and an Army officer wait at the small takaram hut, on which the beating rain hammers loud. All of these are marked 'Al Noor Charity Foundation'.

To look upon Oddamavadi is to look upon what is essentially a mass grave. The markers bear no names, only numbers.

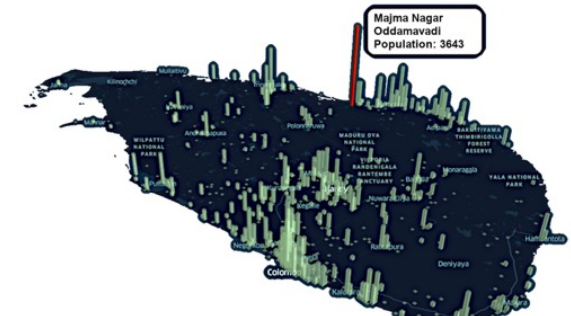


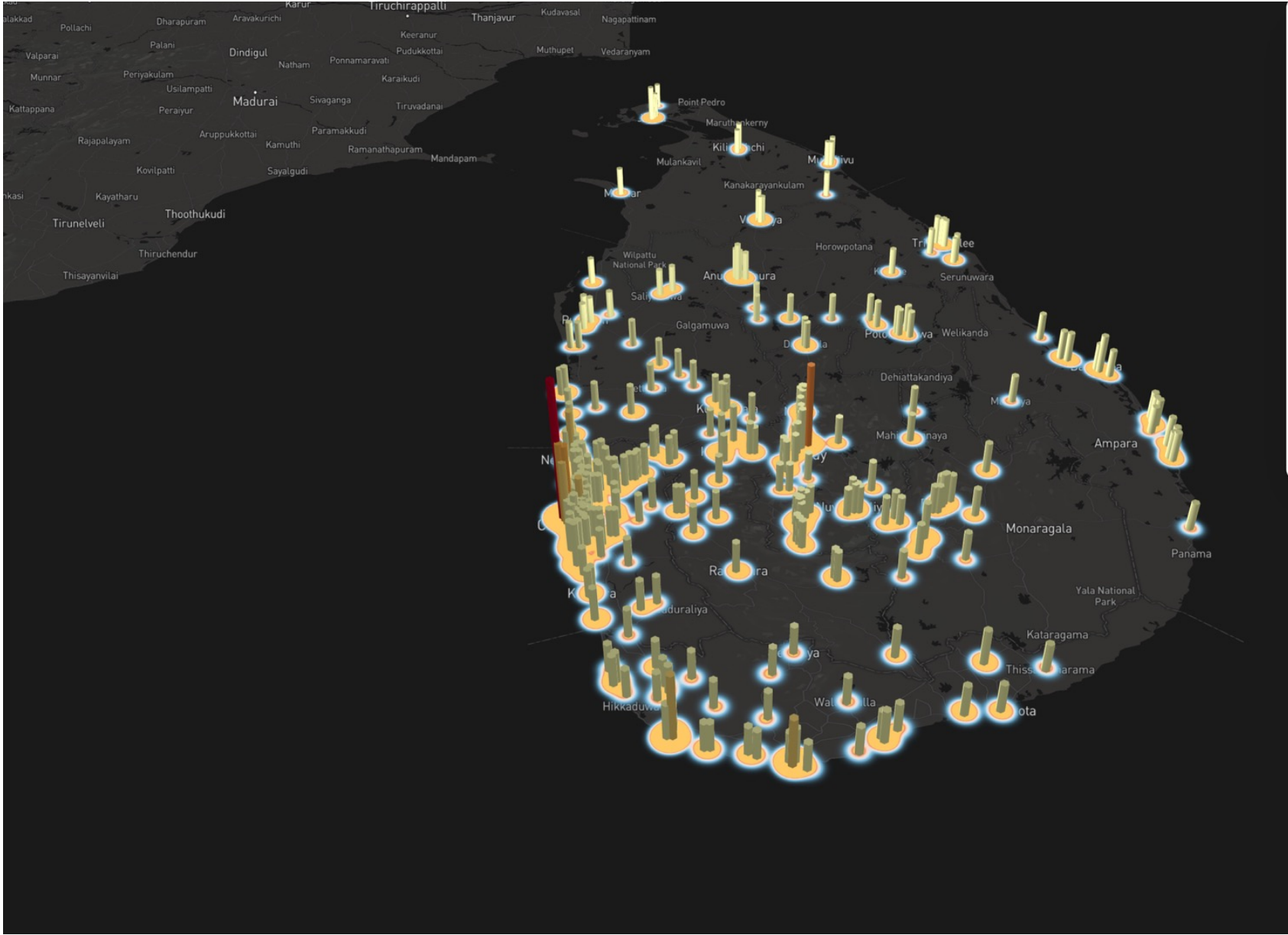
Activity	Expenditure (LKR)	Implementing agency
PCR testing	42,605,812	Ministry of Health; University Grants Commission
Advocacy Programme	67,543,967	Ministry of Health
Quarantine facilities	38,031,065	Ministry of Health; Ministry of Defence
National Vaccination Programme	41,545,980	Ministry of Health
Purchase of ICU beds	7,750,000	Ministry of Defence

Over 67 million was spent on 'advocacy programmes'; none was sent towards the mass grave of over 3000 bodies. As of the time of our investigation, there was approximately Rs. 1,827,476,528 in balance unused and unaccounted for.

## Counting bodies

In March this year, Watchdog set out to examine Oddamavadi: in addition to site visits and interviews, we also obtained the logs — often maintained by the volunteer burial workers — of those interred there. These are the snippets you've seen throughout this story, with the names encrypted and addresses trimmed to protect privacy.





### Protest Heatmap

Showing 623 protests and 51 conflicts from Wednesday, 30/03/2022 to Thursday, 19/05/2022

MODE

2D
  3D

TYPE

protest
  conflict

DATE

You can also filter by a [specific data range](#).

- ① You can drag the handles in the filters section from either direction to filter the protests based on date.
- ① To zoom in on a specific area, hold down the **Shift Key** and left-click while dragging the mouse cursor. You can also hold the **Control Key** to rotate around a certain point.
- 🔗 Data source via [@TeamWatchdog](#) (view methodology)

Last updated about 2 years ago

## Mannar District General Hospital

**Request ID:** ikWhloABFPy-ZFU4w3Da

**Request Submitted On:** April 13, 2022 4:44 PM

**Requested By:** Uma Gayathrie Raveendran

**Requester Designation:** Medical Officer - Medicine

**Requester Contact Number:** [0767459224](tel:0767459224)

29 10

### Drugs

PARACETAMOL TABLETS 500MG

PANADOL

SRI LANKA I

Smithkline Beecham (Pvt) Ltd

PARACETAMOL TABLETS BP 500MG

PACETOL

INDIA II A

ABC Pharma Services Pvt. Ltd

PARACETAMOL TABLETS BP 500MG

ZIFAM

INDIA II A

Alaris Lanka (Pvt) Ltd

PARACETAMOL TABLETS BP 500MG

\*\*\*

SRI LANKA II B

Astron (Pvt) Ltd

Print

Edit Request

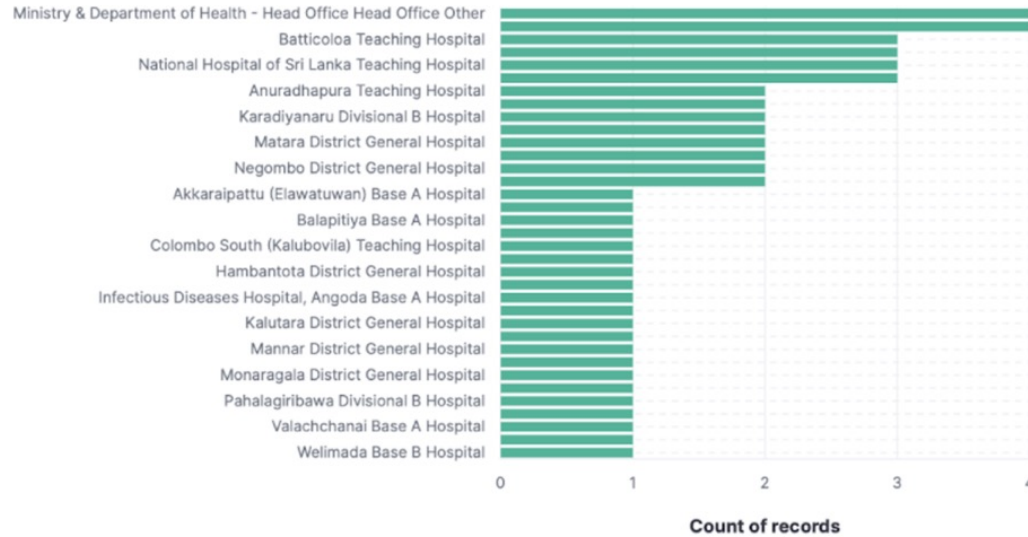
Delete Request

### Drugs

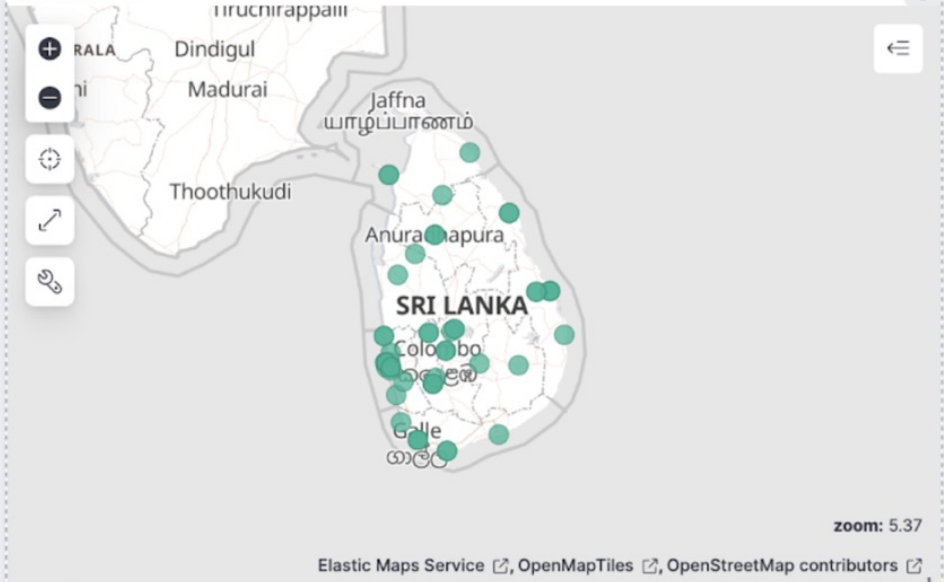
Generic Name	Brand Name	Importer	Quantity
ETOMIDATE INJECTION USP 20MG/10ML	***	Yaden International (Pvt) Ltd	—
METHYLENE BLUE INJECTION USP 10MG/ML	VERBLUE	Leader Pharma Pvt Ltd	—
LIDOCAINE HYDROCHLORIDE 2% JELLY	XYLOCAINE	Hemas Pharmaceuticals (Pvt) Ltd	—
VASOPRESSIN INJECTION IP 20 UNITS/ML	VASMED	Klintas (Pvt) Ltd	—
PARACETAMOL TABLETS 500MG	PANADOL	Smithkline Beecham (Pvt) Ltd	—
DICLOFENAC SODIUM SUPPOSITORIES	CLOFENAC	PharmAce (Pvt) Ltd	—

### Institutions making requests

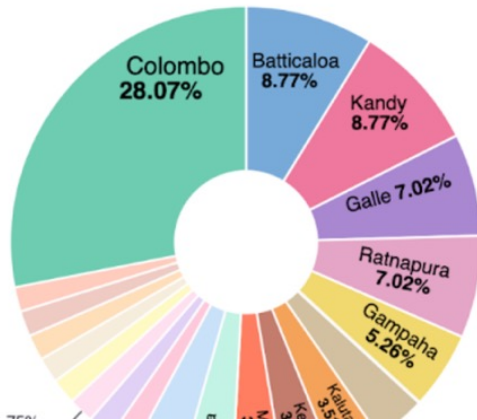
Top values of institution.fullName.keyword



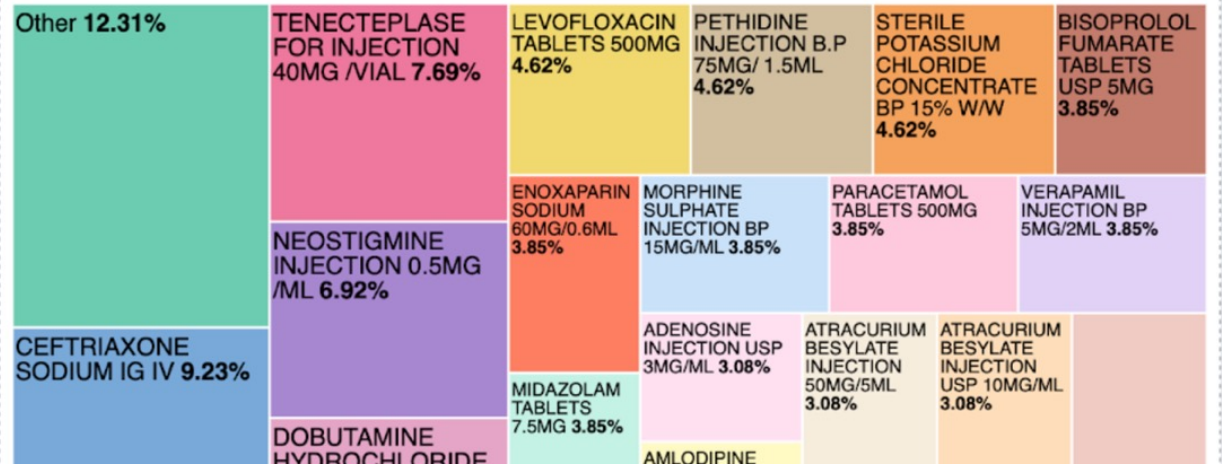
### Request Map



### By District



### Meds as % of requests

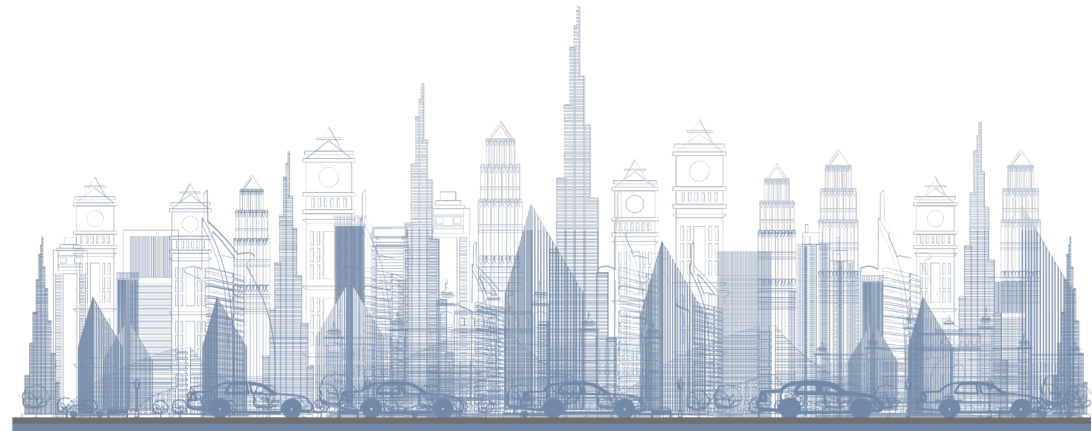


# COLOMBO: THE VIRTUAL TWIN



# CITY SIMULATION INTRODUCTION

- Colombo is badly in need of good urban design, but urban design interventions are HARD to imagine.
- Ideas are usually in the realm of technical reports, research papers and half-baked op-eds by political pundits.
- As a result, the general public - and even policymakers- fall prey to misinformation and never get to visualize a problem.

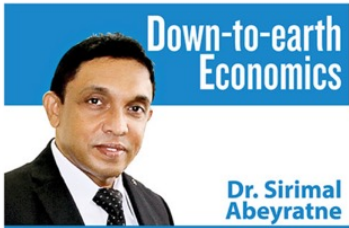


## Right to misinformation

View(s):

It was after I wrote on the Millennium Challenge Corporation (MCC) Compact grant under the title "Transport corridors and elephant corridors" in this column on September 15, that this commentary opened the doors to a couple of follow-up interviews.

One of the interviewers asked me: "If Sri Lanka accepts this grant, according to various reports and social media, the country will be divided into two pieces, acres of our land will be sold out to the US, and we – the Sri Lankans, will have to get American visas to go to Anuradhapura. What is your response to these claims?"



I replied: "I don't think they had even seen the MCC agreement, which is not yet released to the public. This is like 'throwing a lit match stick to the Amazon forest'. The source of origin is difficult to identify. Finally, the Amazon forest is on fire but none is responsible and accountable".

Last week, it was reported that the Cabinet has approved the MCC agreement, and that the agreement was also released to the public.

I thought of referring to the MCC grant again, not to take part in any debate, but to expose an important development issue: "How difficult it is for a country with weak democratic institutions to become a developed nation".

### Throwing a lit match stick

Last July, "a lit match stick" was thrown into a social media platform. The comment went viral and, perhaps, became one of the sources of "wildfire" on the MCC grant. The ideas as such were articulated rationally into a doctrine by the parties with vested interests, comprising some professionals, some politicians, some intellectuals, and some opinion-makers. At a time when the MCC agreement was also not available for verification, the propaganda spread freely like a wildfire.

What came through one of the social media platforms included the following: "...the MCC agreement is nothing but a plan to splinter Sri Lanka and turn it into a US Military Base". Then it went on to explain the alleged key points of the MCC grant in order to substantiate the above claim. Some of these key points are as follows:

"...The Americans demanded from Sri Lanka an Economic Corridor of 1.2 million acres of land from Trincomalee to Colombo for a lease period of 200 years and they insisted that US law must prevail within this corridor. The US has offered US\$400 million for the corridor which works out to Rs.24 per acre per month. It appears that Sri Lanka has been offered \$80 million more. The construction of an Electrified Railway Line from Trincomalee to Colombo protected with electric fences on either side, which will effectively physically split the country into two. Anuradhapura and Kurunegala will be in the north of the corridor. The allegations above if true, show that it is an agreement that destroys the sovereignty and territorial integrity of Sri Lanka."



## Govt. halts Japan-funded light rail project

June, 19, 2020



Sri Lanka has decided to halt the Colombo light rail project, funded by Japan International Cooperation (JICA) as it was too costly and brought low returns, Government ministers said.

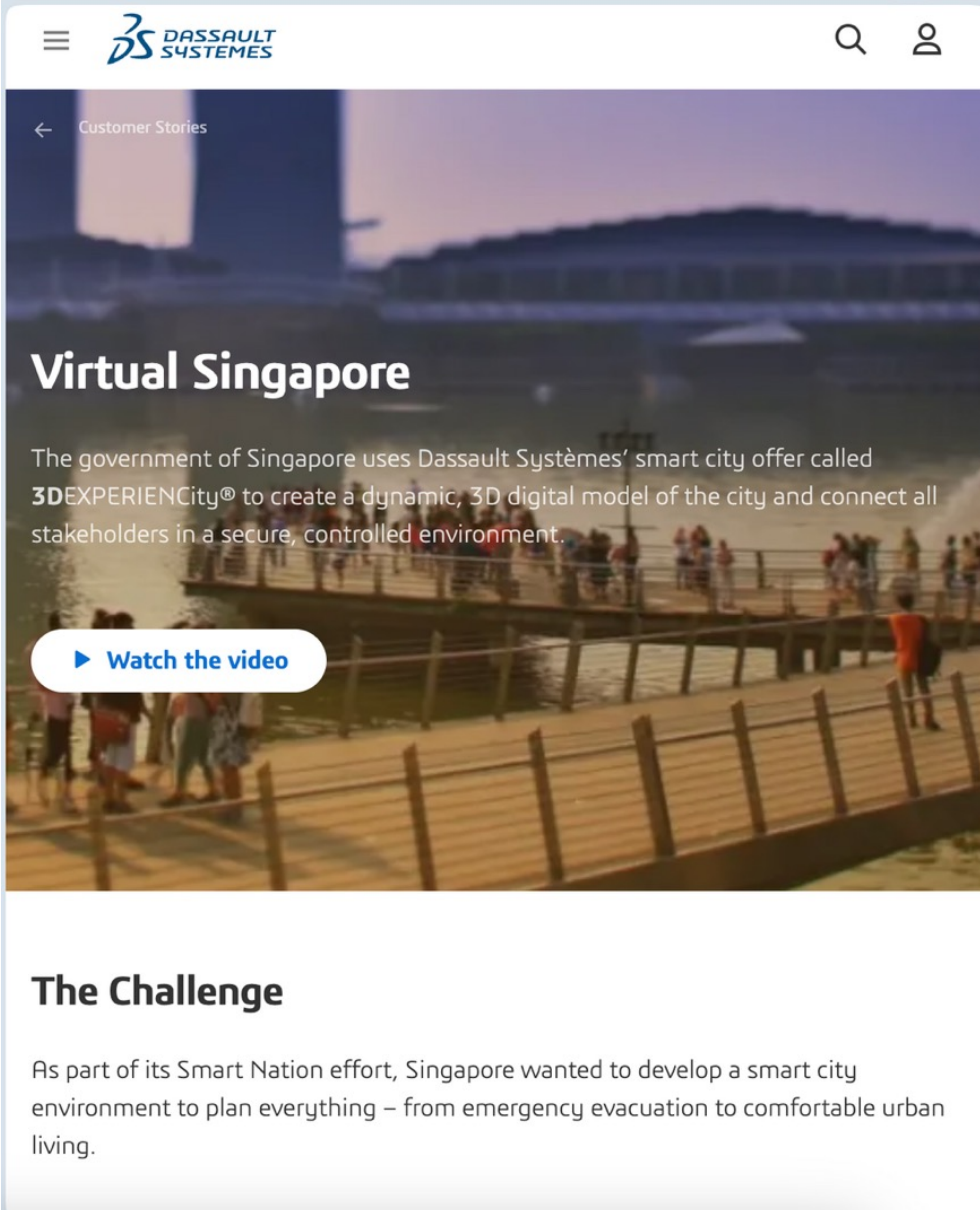
"The light rail project stretching from Colombo to Malabe was not cancelled by JICA. It was in fact cancelled by the government of Sri Lanka due to it being too costly and not productive enough," Co-Cabinet Spokesman Minister Bandula Gunawardena told reporters at the press conference held yesterday (18) to inform the Cabinet decisions.

"Many buildings will be affected as a result of the Colombo light rail project. This will cause major damage to properties and we will have to compensate them for that. Hence, it is not productive. That is why the project was cancelled," Co-Cabinet Spokesman Minister Ramesh Pathirana said.



# THE LURE OF THE DIGITAL TWIN

- **DYNAMIC TRAFFIC SIMULATION AND OPTIMIZATION**
- Real-time modeling of traffic flows, congestion patterns, and bottlenecks
- Testing different signal timing and road configuration scenarios virtually
- Predicting impacts of road closures or special events on traffic patterns
- Infrastructure planning and maintenance
- Monitoring structural health of bridges, roads, and tunnels through sensor data
- Identifying maintenance needs before failures occur
- Testing how new infrastructure projects would impact existing systems
- Public transport optimization
- Modeling passenger flows and demand patterns across transit networks
- **OPTIMIZING BUS/TRAIN SCHEDULES AND ROUTES BASED ON USAGE DATA**
- **TESTING IMPACTS OF SERVICE CHANGES OR DISRUPTIONS**
- **URBAN DEVELOPMENT ASSESSMENT**
- ANALYZING HOW NEW BUILDINGS AFFECT WIND PATTERNS, SUNLIGHT, AND PEDESTRIAN FLOWS
- **SIMULATING ENERGY USAGE AND ENVIRONMENTAL IMPACTS OF DEVELOPMENT**
- **TESTING DIFFERENT ZONING AND LAND USE SCENARIOS**
- **EMERGENCY RESPONSE PLANNING**
- **SIMULATING EVACUATION SCENARIOS AND EMERGENCY VEHICLE ROUTING**
- **TESTING DISASTER RESPONSE PLANS IN A VIRTUAL ENVIRONMENT**
- **IDENTIFYING VULNERABLE AREAS AND INFRASTRUCTURE**



The screenshot shows a web page for 'Virtual Singapore' on the Dassault Systèmes website. The page features a large background image of a wooden boardwalk by a waterfront with people walking. At the top left is the Dassault Systèmes logo, and at the top right are search and user icons. Below the logo is a navigation menu with a 'Customer Stories' link. The main heading is 'Virtual Singapore'. Below the heading is a paragraph of text: 'The government of Singapore uses Dassault Systèmes' smart city offer called 3DEXPERIENCE City® to create a dynamic, 3D digital model of the city and connect all stakeholders in a secure, controlled environment.' A blue button with a play icon and the text 'Watch the video' is positioned below the text. At the bottom of the page, the section 'The Challenge' is visible, with the text: 'As part of its Smart Nation effort, Singapore wanted to develop a smart city environment to plan everything – from emergency evacuation to comfortable urban living.'



## CUBE

Predictive transportation modeling and simulation software.

CUBE is a predictive transportation modeling and simulation software for transportation planners, engineers, and city planners to visualize and test scenarios. You can compare potential benefits and uncover unexpected consequences to save time and money during the review cycles before entering the design process.

Supporting any mode of transport. CUBE delivers a true multimodal approach with feedback interactions between different modes including pedestrians, bikes, cars, freight, buses, bus rapid transit, rail, air, water, and more.

FEATURES PRODUCT TIERS TECHNICAL CAPABILITIES FAQs

### Understand the impact of transportation



CUBE and its extension applications cover all aspects of transportation to help you better understand the impact before implementation. You can access interactive data input and

### CUBE

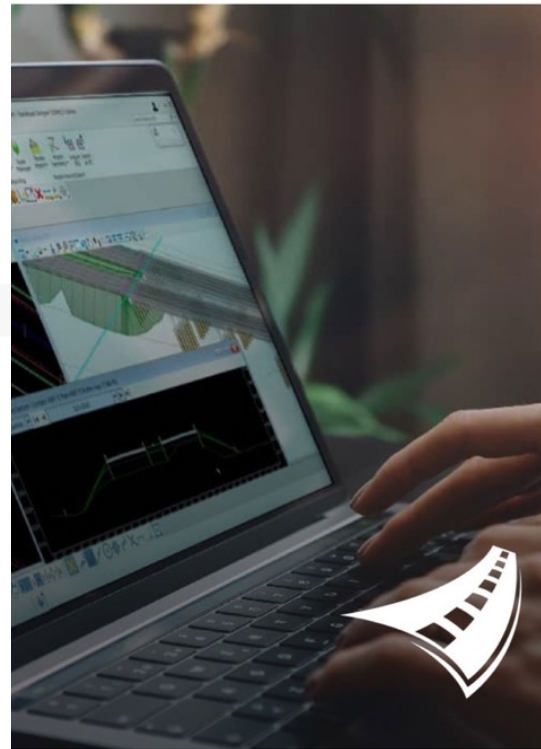
\$6,000 – 8,600  
12-month subscription

#### Including 3 Keys

- ✓ Redeem Keys (training credits) for training or services of your choice
- ✓ CUBE | Access interactive data input and analysis, GIS functionality, model building, and scenario development
- ✓ CUBE | Create the best plan for your area with macroscopic movement data of people and vehicles
- ✓ Land Add-on | Integrate with transportation models to predict land-use changes to the transportation system
- ✓ Cargo Add-on | Modeling freight demand to quickly understand or predict the impact of commodity flows

COMPRAR

Site Design > OpenRoads Designer



## OpenRoads Designer USD \$6,481.00

Taxes not included. Purchase includes 3 Keys <sup>?</sup>

Qty

1

ADD TO CART

ADD TO COMPARE

#### Roadway design software

- ✓ Design in context of reality
- ✓ Reuse design elements
- ✓ Model design intent
- ✓ Integrate across disciplines

**About this software subscription:** This Virtuoso Subscription includes a 12 month practitioner license of this software, that comes with Keys (credits) to unlock training and services.





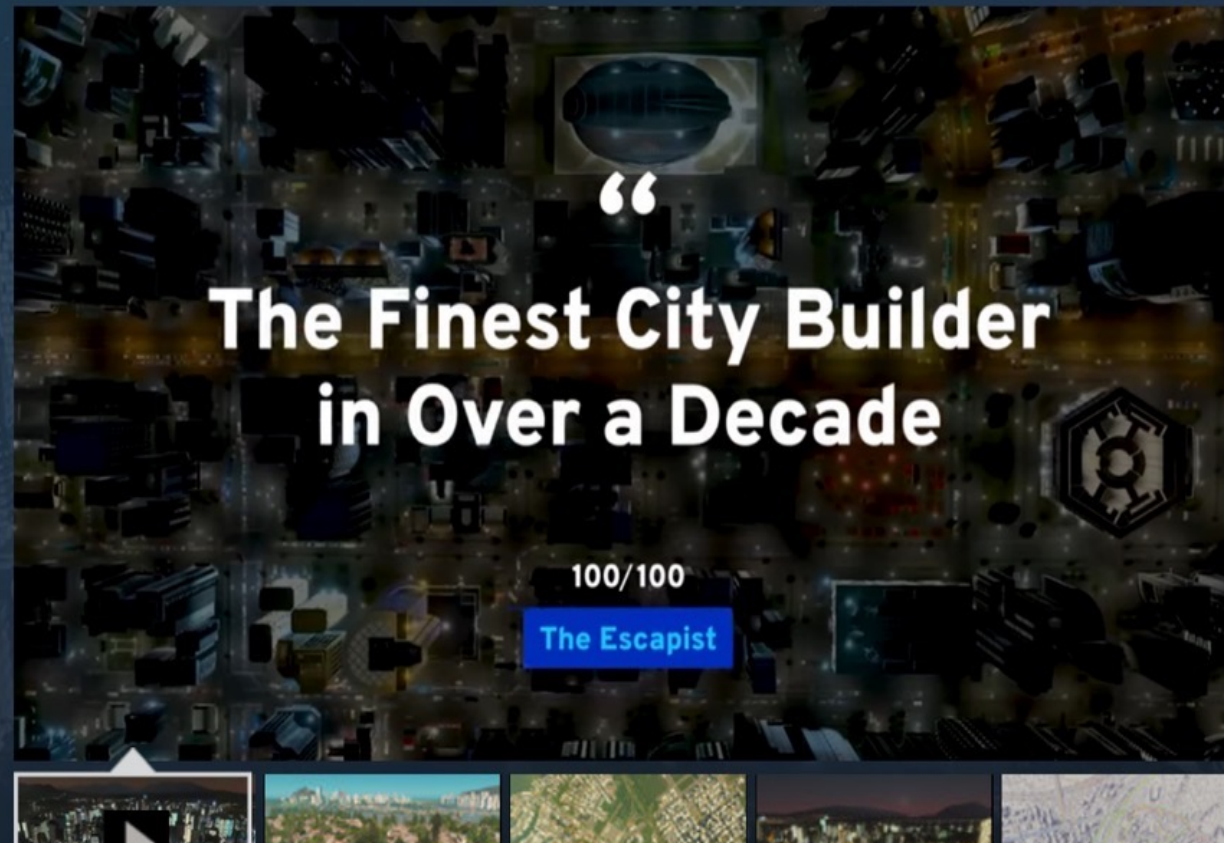
Colombo

€2,098,922,692    +€400,724    1,020,775    +2,481    296

All Games > Simulation Games > Cities: Skylines - Official Franchise > Cities: Skylines

# Cities: Skylines

Community Hub



Cities: Skylines is a modern take on the classic city simulation. The game introduces new game play elements to realize the thrill and hardships of creating and maintaining a real city whilst expanding on some well-established tropes of the city building experience.

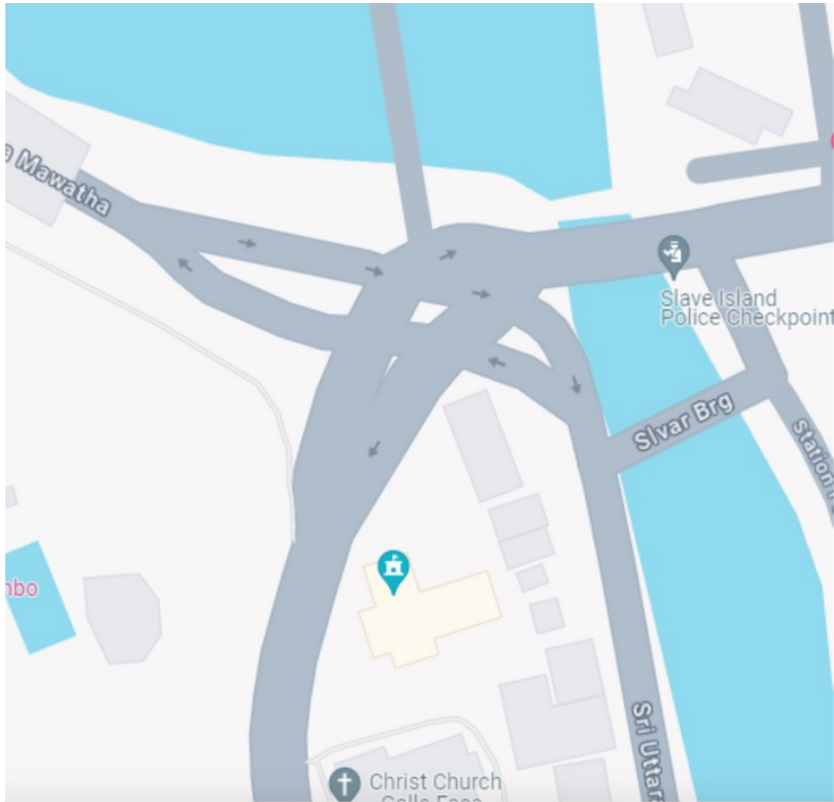
RECENT REVIEWS: **Very Positive** (1,567)

ALL REVIEWS: **Very Positive** (192,314)

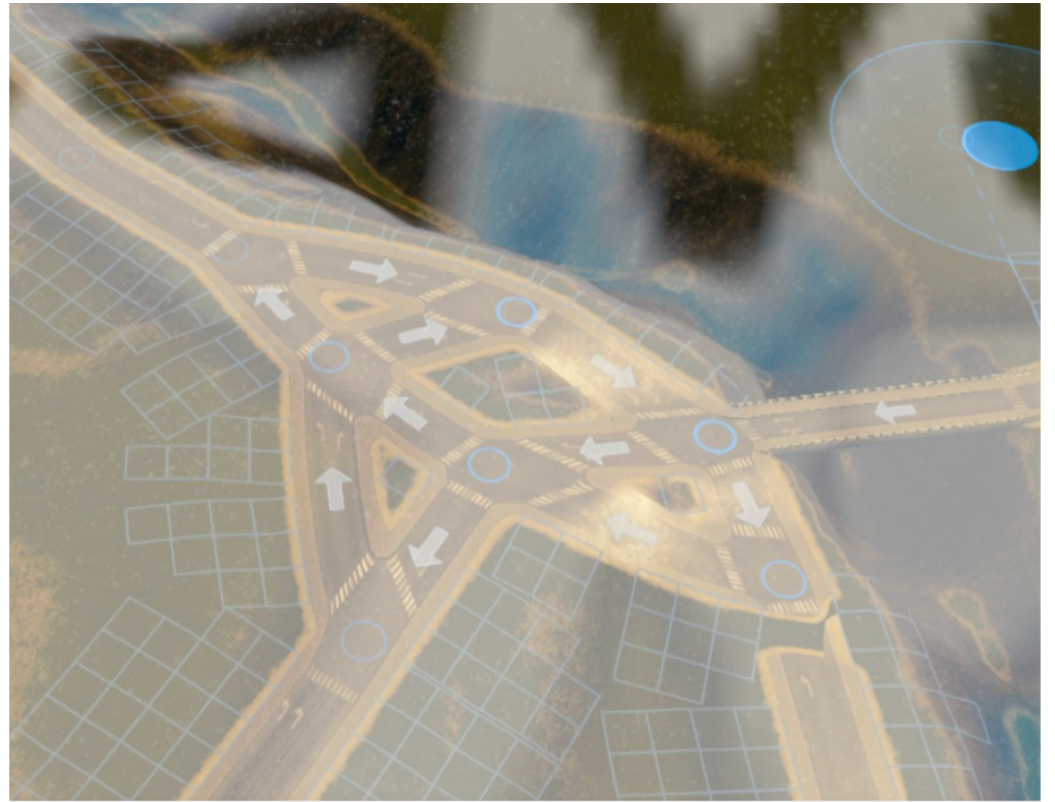
RELEASE DATE: 10 Mar, 2015

DEVELOPER: **Colossal Order Ltd.**

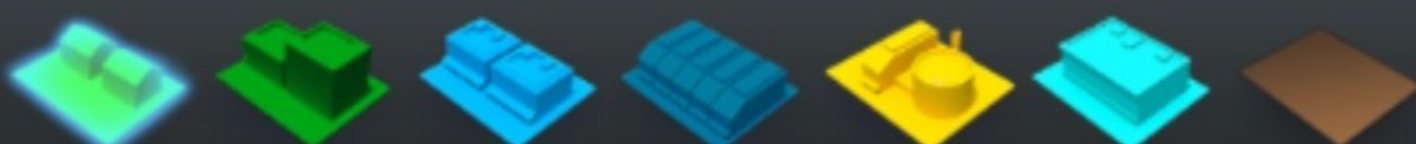
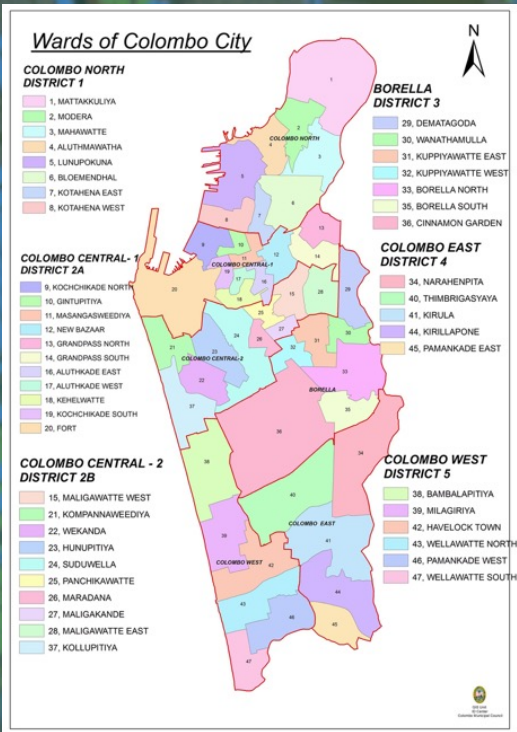
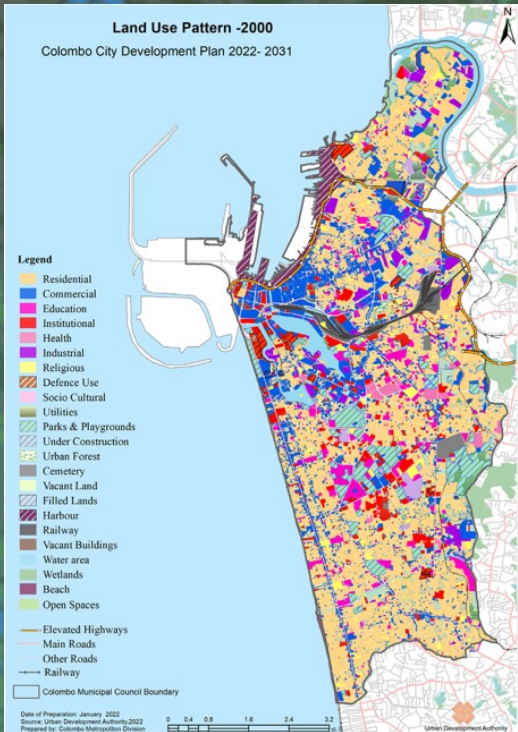
PUBLISHER: **Paradox Interactive**

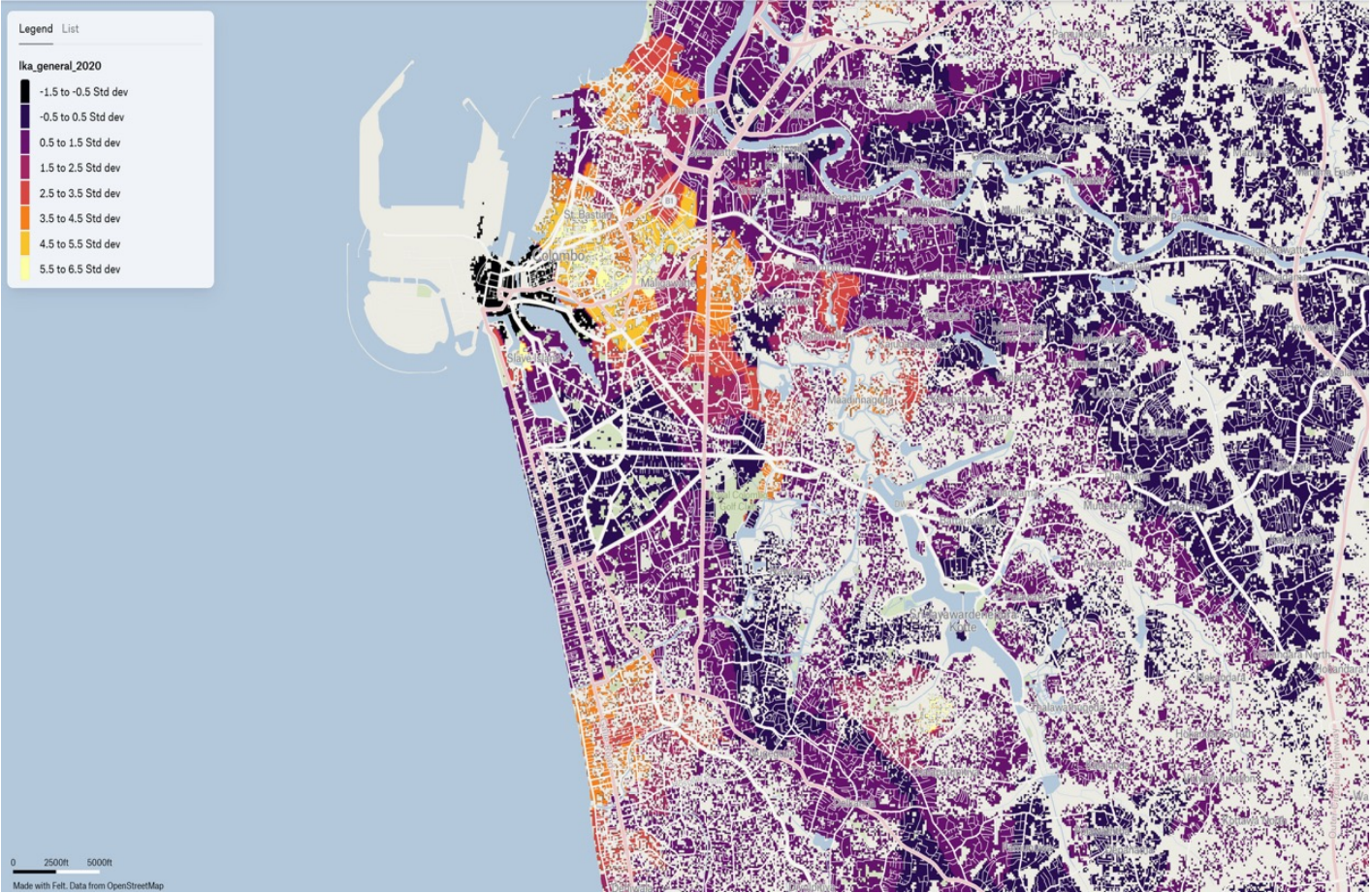


**GOOGLE MAPS**

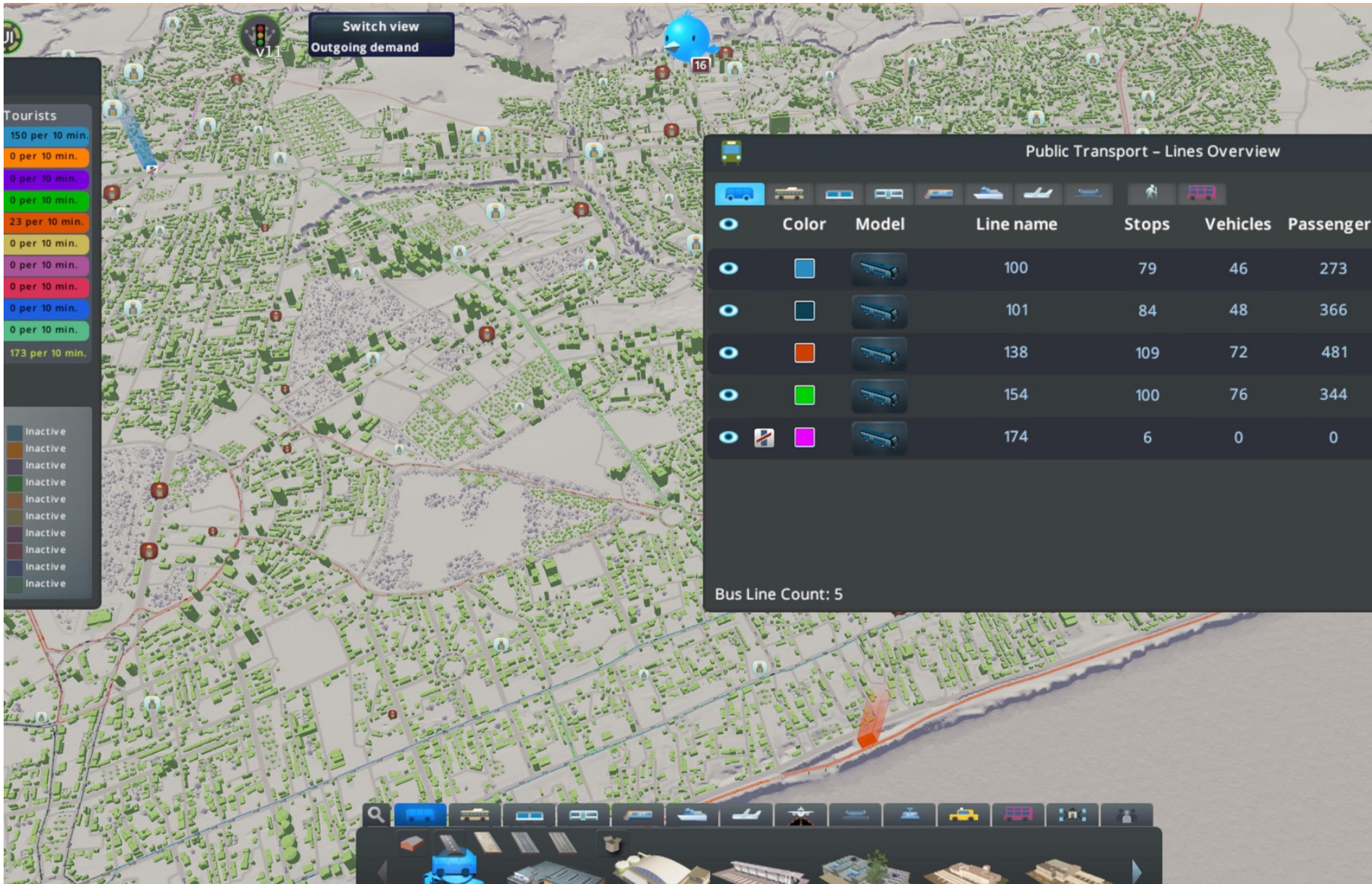


**OUR IMPLEMENTATION**









Switch view  
Outgoing demand

Tourists

- 150 per 10 min.
- 0 per 10 min.
- 0 per 10 min.
- 0 per 10 min.
- 23 per 10 min.
- 0 per 10 min.
- 0 per 10 min.
- 0 per 10 min.
- 0 per 10 min.
- 0 per 10 min.
- 173 per 10 min.

Inactive

- Inactive
- Inactive
- Inactive
- Inactive
- Inactive
- Inactive
- Inactive
- Inactive
- Inactive
- Inactive

### Public Transport - Lines Overview

Color	Model	Line name	Stops	Vehicles	Passenger
		100	79	46	273
		101	84	48	366
		138	109	72	481
		154	100	76	344
		174	6	0	0

Bus Line Count: 5



# Colombo 8



Children	6227
Teens	4704
Young Adults	3158
Adults	6215
Seniors	10704



## ★ Average Zoned Buildings Level



## POLICIES

- COLOMBO MUNICIPAL COUNCIL
- SRI LANKA ROAD DEVELOPMENT AUTHORITY
- SRI LANKA URBAN DEVELOPMENT AUTHORITY
- SRI LANKA DEPARTMENT OF CENSUS AND STATISTICS
- UNIVERSITY OF MORATUWA'S DEPARTMENT OF TRANSPORT AND POLICY PLANNING
- META'S DATA FOR GOOD PROJECTS, ESPECIALLY THEIR POPULATION MAPPING WORK WITH THE CENTER FOR INTERNATIONAL EARTH SCIENCE INFORMATION NETWORK (CIESIN) AT THE COLUMBIA CLIMATE SCHOOL
- UN-HABITAT
- THE COMTRANS REPORTS AND ITS ASSOCIATED STUDIES AND SURVEYS
- OPENSTREETMAP
- ESA'S SENTINEL-2 PROGRAM
- GOOGLE MAPS AND ROUTEMASTER.LK FOR BUS AND TRAIN ROUTES



- **7728 M AT ITS LONGEST (REAL CITY FOR THE SAME: 7780M)**
- **4585.6 M AT ITS WIDEST (REALITY: 4611.2M)**
- **OVER 99% MATCH IN ROAD LAYOUT, PARKS, AND WATER BODIES**
- **1,044,500 VIRTUAL CITIZENS (ESTIMATED 2020 POPULATION IN REALITY:  
1,048,000 TOTAL PEOPLE**
- **FUNCTIONAL PUBLIC TRANSPORT: BUS AND TRAIN ROUTES THAT MATCH REAL-  
WORLD ROUTES**
- **CUSTOMIZABLE (PER-BUILDING, PER-DISTRICT) POPULATION DENSITY, CITIZEN  
LIFECYCLES, AND TRANSPORT PREFERENCES**

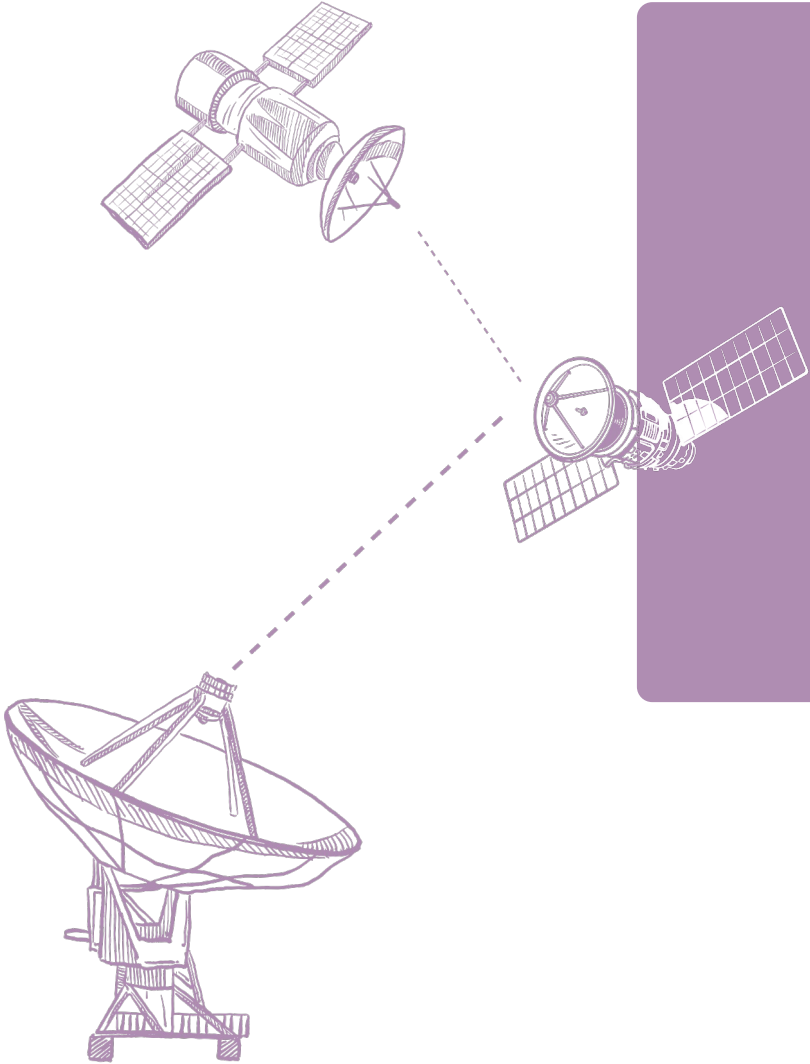
**Our virtual city of Colombo serves as a crude "Digital Twin," offering a platform to:**

- Visualize and understand current urban design issues
- Test and communicate potential infrastructure changes
- Explore the impact of policy decisions on traffic and population distribution
- Educate students and the public about urban planning concepts

**Potential applications include:**

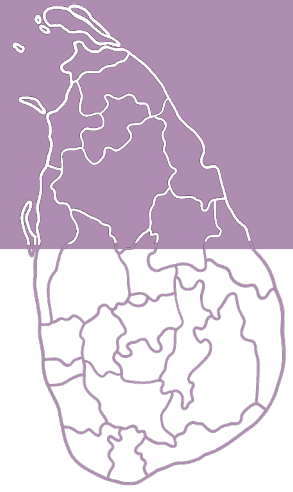
- Simulating changes in roads, transport routes
- Exploring effects of changes in private transport policies
- Visualizing impact of new infrastructure like monorails or wider pavements
- Assessing effects of large-scale plans such as the COMTRANS master plan

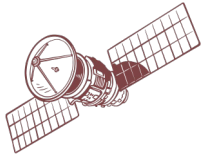




# MAPPING FROM ORBIT

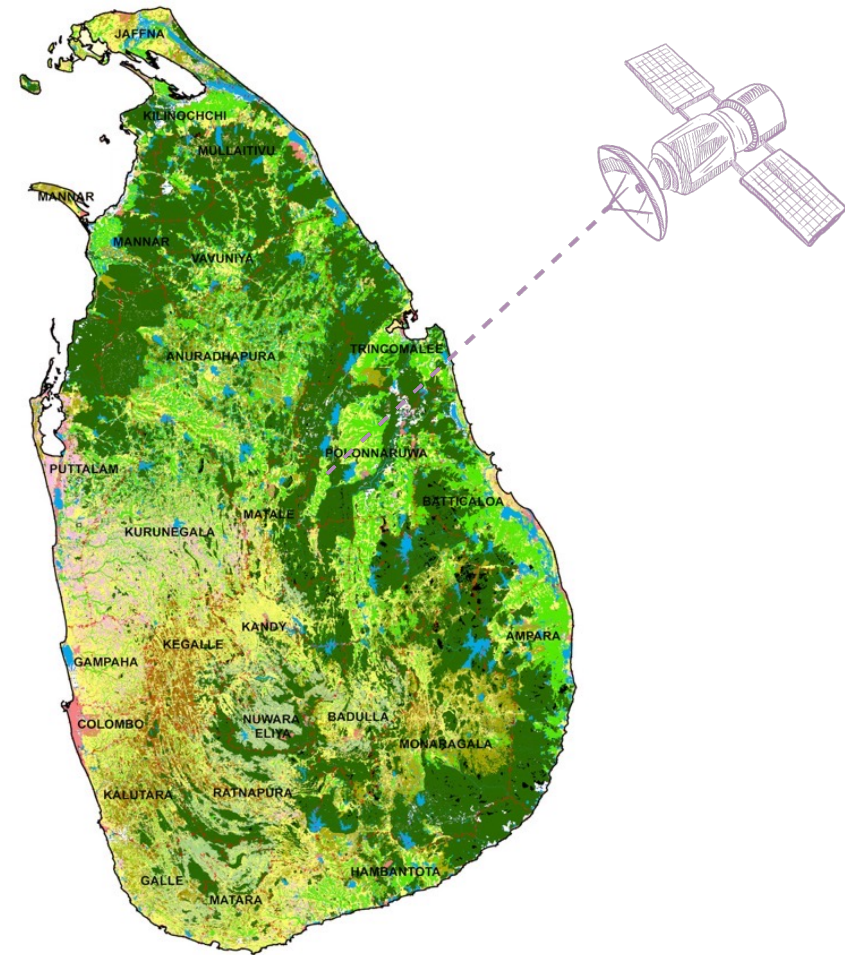
 WATCHDOG





# ANNOTATED MAPS

In a rapidly urbanizing country,  
how has our environment changed?





## ESA Sentinel-

2



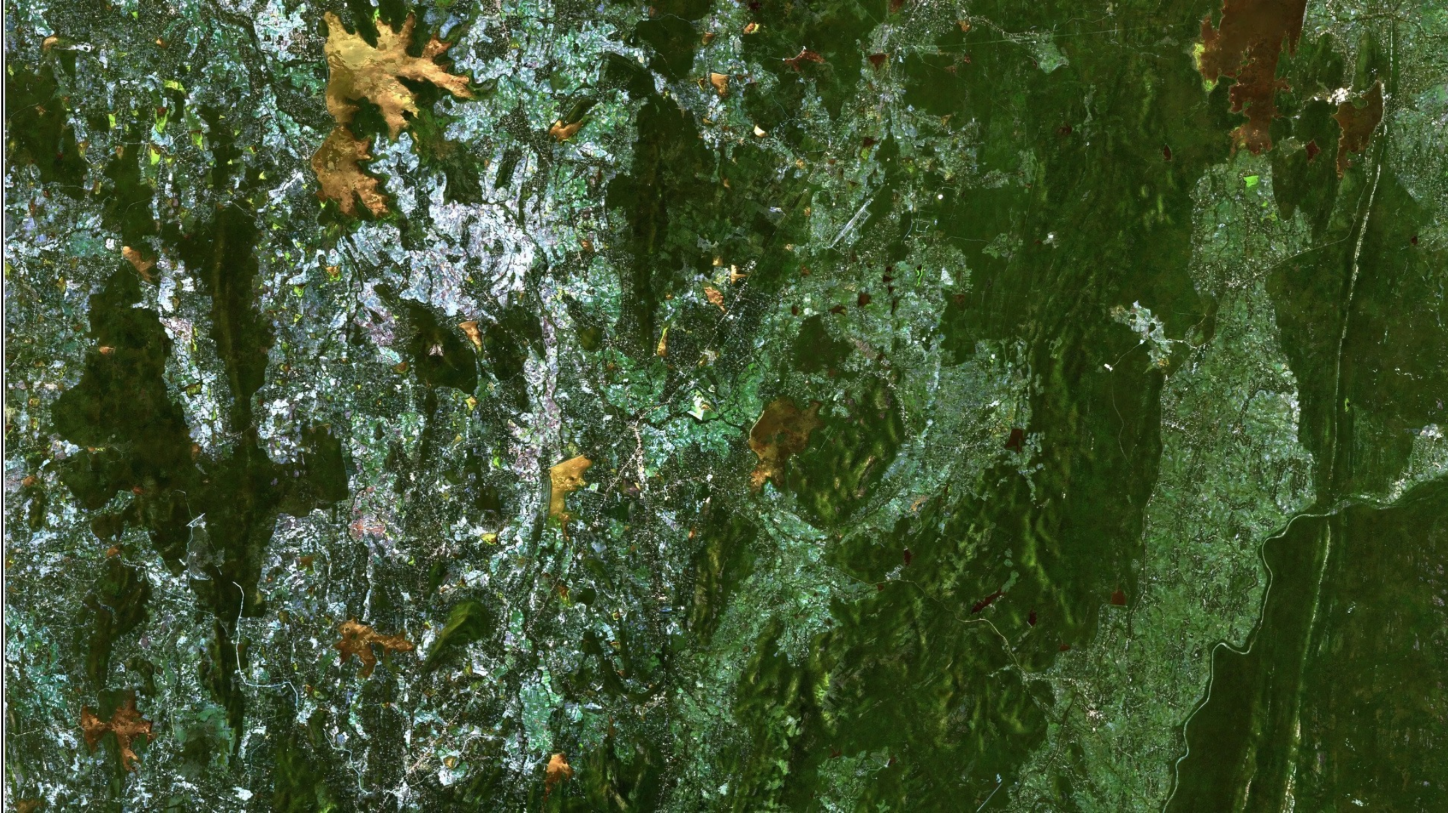
- four bands at 10 m
- six bands at 20 m
- 290 KM orbital swath
  - freely available



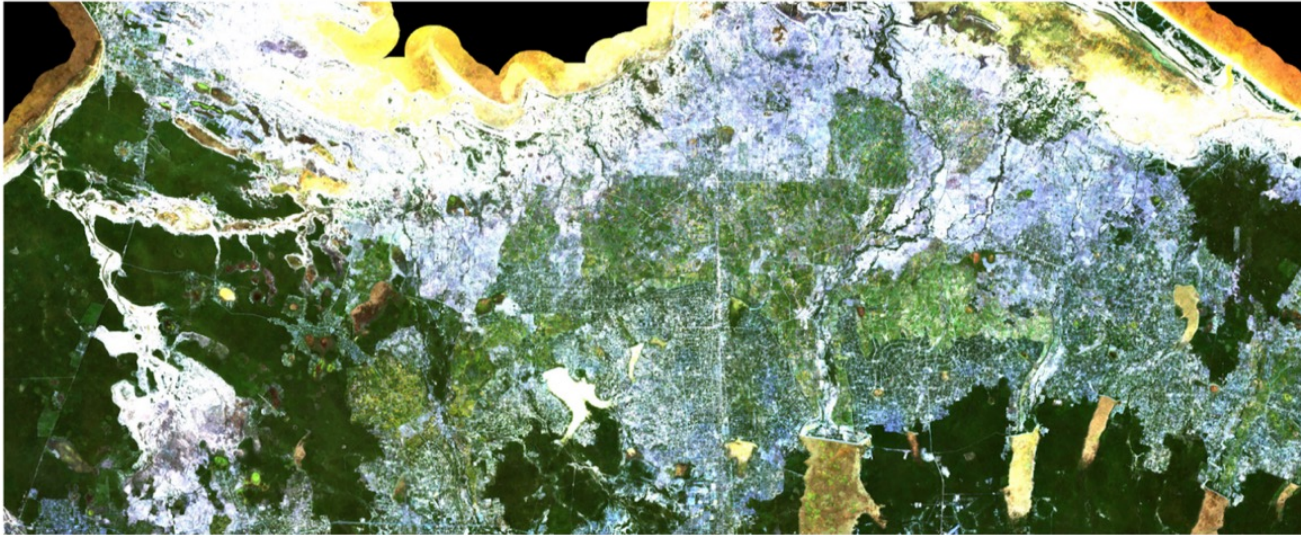
2018



2024



In 2018, the area between Nallur, Kilinochchi and Kandavalai looked like this.



In 2024, it looks like this:



Kilinochchi is a very agricultural area. As far back as 2015, government estimates suggested that almost 25% of the area was paddy, that about 13% were home gardens, and about 24% were forest[2][3]. By now, it looks like those patches of semi-forest land in the middle have been filled up - from the east to the west, there's a much broader belt of agriculture.

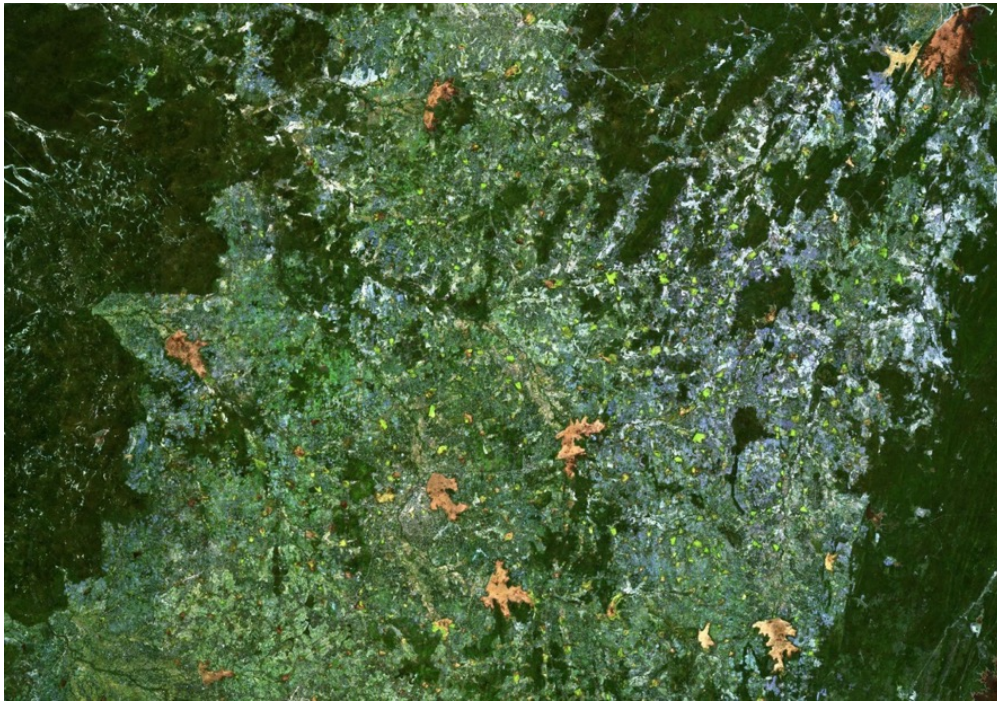
This broadly tracks certain large infrastructure schemes in the area. Since 2017, at least, the Agriculture folks in government have been attempting to restore unused agricultural land, including in Kilinochchi [4]. The Regional Agriculture and Research Development Center is a thing (albeit quite understaffed) and people working on the sector seem to be pushing crops that might suit the area better. Plans have also existed at least since 2017 to upgrade waterways, roads, and bring in large industry (MAS Active, MAS Vidiyal, KIST, etc), with varying degrees of resource allocation and success.

At least some of this stuff seems to have worked, at least from a big picture perspective. 2022 statistics from the UDA put paddy at 44% of the land use of Kilinochchi [6].

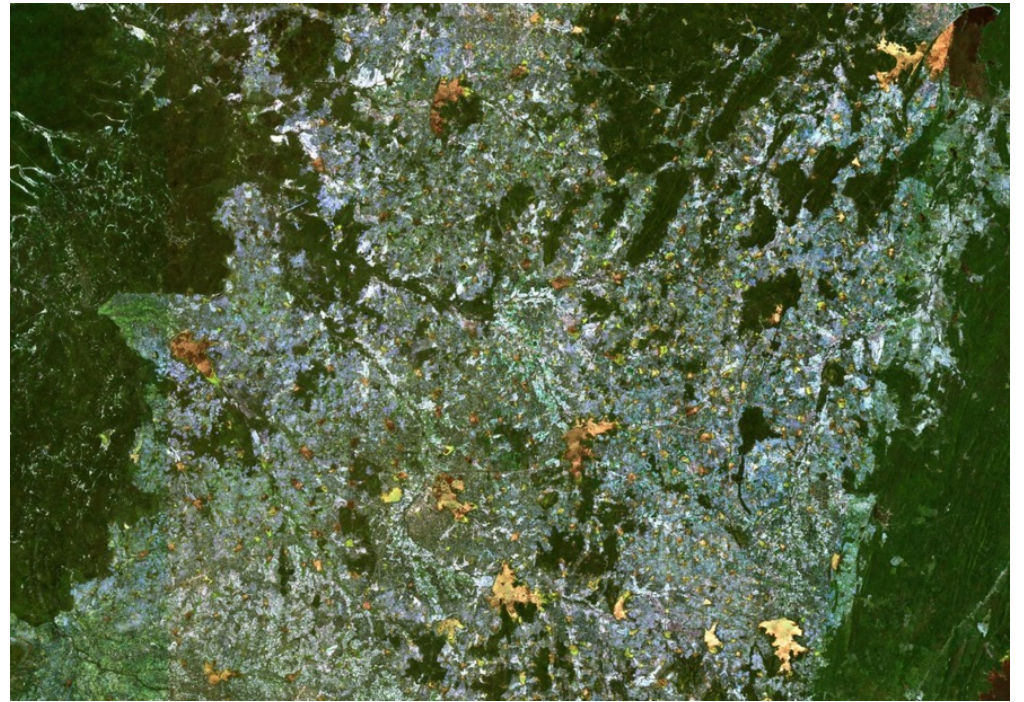
However, Kilinochchi remains poor, with over 18% of its headcount below the poverty line as of 2022, and despite the predominantly agricultural character was one of the hardest hit during the agricultural collapse brought about by Gotabaya's fertilizer ban [6][7]. Time (and more imagery) will tell whether plans like the ADB's [8] \$250 million+ drinking water project and rural road development plan [9] will help this situation.

This is also where things get thorny with regard to environmental loss. Like it or not, Sri Lankan agriculture is of the slash-and-burn variety [10]. Low-tech agriculture means we go horizontal rather than vertical. Inevitably, large amounts of tree cover vanish, replaced by bare land that struggles to cool itself or retain water. Kilinochchi has largely kept the forests at its borders, but if you pay close attention, you can see the browning at the edges of roads, and the slow loss of what was once green.

Kurunegala-Anuradhapura-Vavuniya



2017



2024

# Hambantot

a



2017



2024

13214 x 21888  
JPG

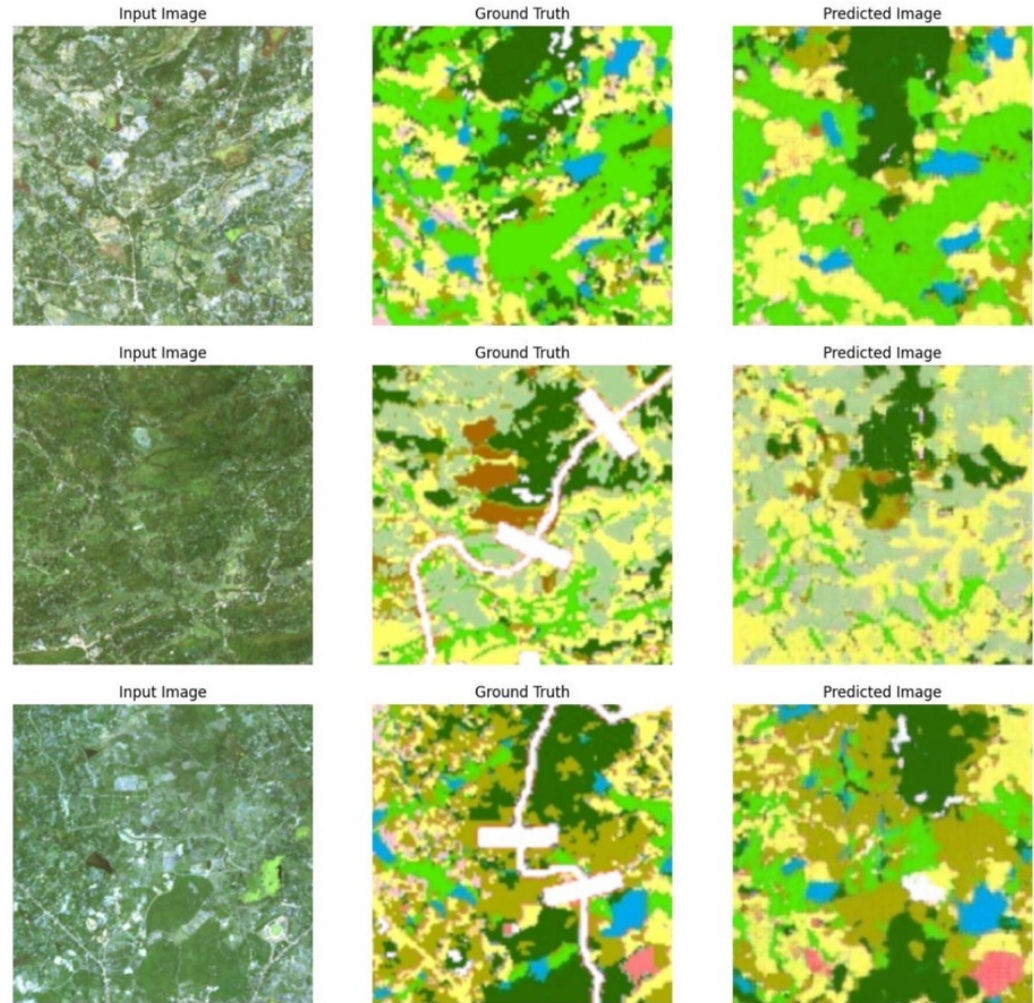
Higher resolution  
PNGs and  
shapefiles  
available!



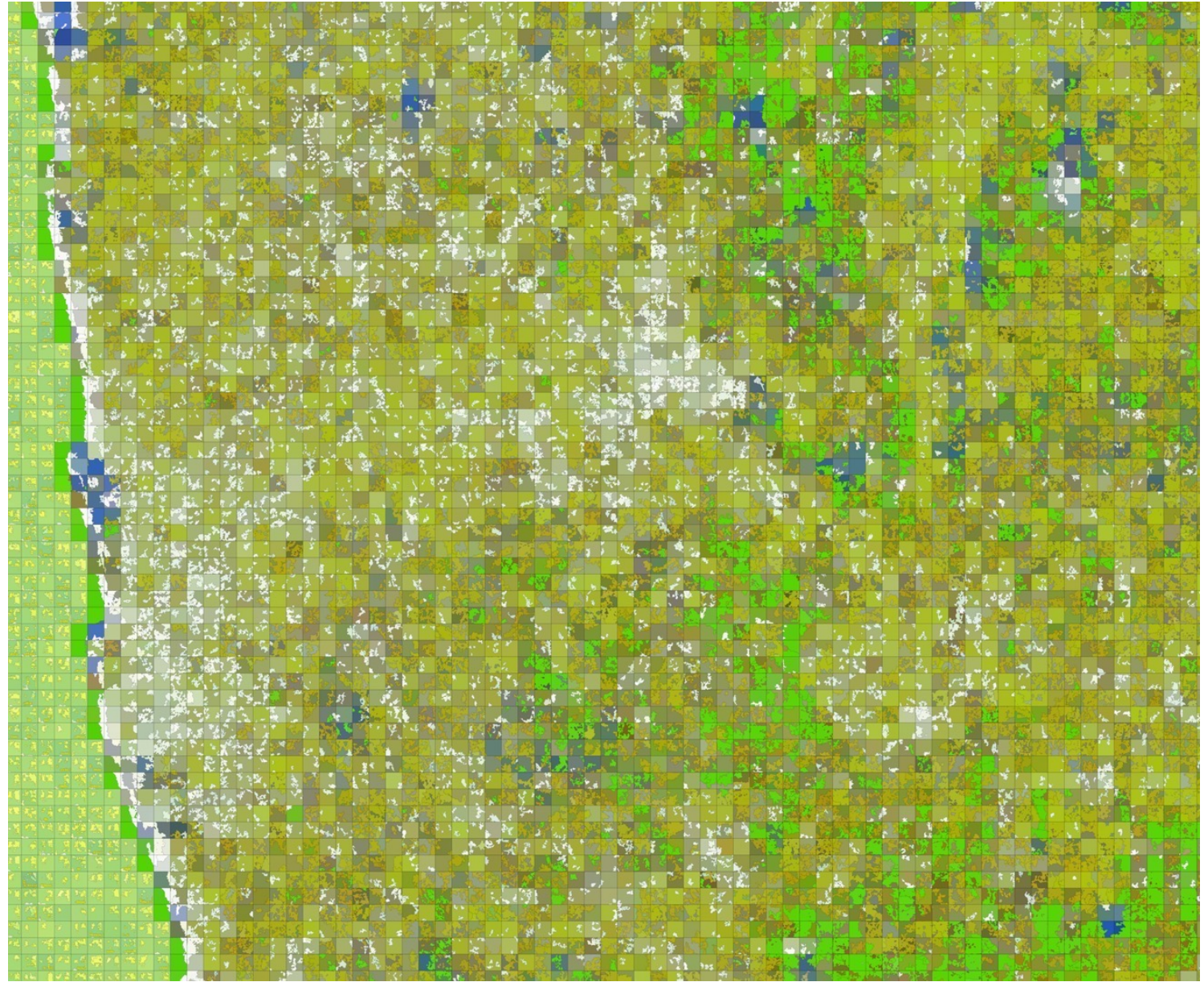
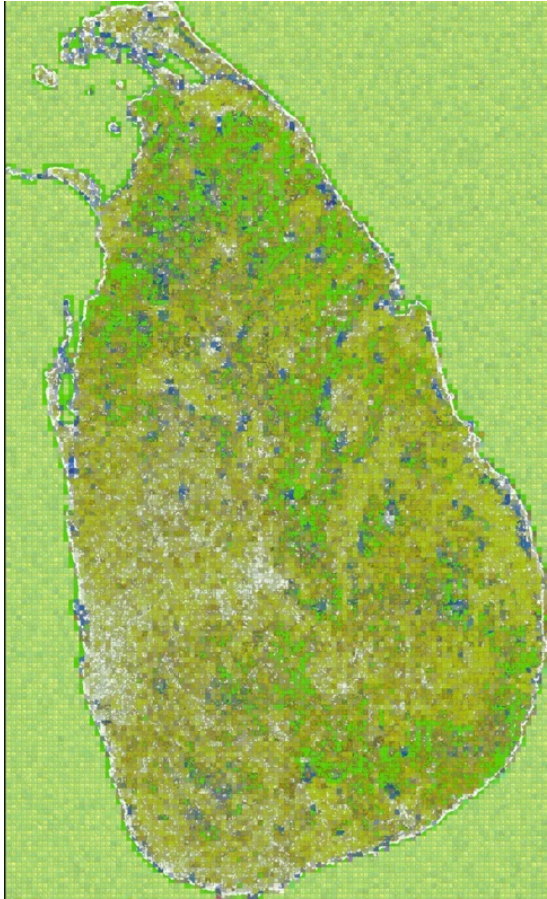
sequential_8 (Sequential)	(None, 2, 2, 512)	4,196,352	sequential_7[0][...
sequential_9 (Sequential)	(None, 1, 1, 512)	4,196,352	sequential_8[0][...
sequential_10 (Sequential)	(None, 2, 2, 512)	4,196,352	sequential_9[0][...
concatenate (Concatenate)	(None, 2, 2, 1024)	0	sequential_10[0]... sequential_8[0][...
sequential_11 (Sequential)	(None, 4, 4, 512)	8,390,656	concatenate[0][0]
concatenate_1 (Concatenate)	(None, 4, 4, 1024)	0	sequential_11[0]... sequential_7[0][...
sequential_12 (Sequential)	(None, 8, 8, 512)	8,390,656	concatenate_1[0]...
concatenate_2 (Concatenate)	(None, 8, 8, 1024)	0	sequential_12[0]... sequential_6[0][...
sequential_13 (Sequential)	(None, 16, 16, 512)	8,390,656	concatenate_2[0]...
concatenate_3 (Concatenate)	(None, 16, 16, 1024)	0	sequential_13[0]... sequential_5[0][...
sequential_14 (Sequential)	(None, 32, 32, 256)	4,195,328	concatenate_3[0]...
concatenate_4 (Concatenate)	(None, 32, 32, 512)	0	sequential_14[0]... sequential_4[0][...
sequential_15 (Sequential)	(None, 64, 64, 128)	1,049,088	concatenate_4[0]...
concatenate_5 (Concatenate)	(None, 64, 64, 256)	0	sequential_15[0]... sequential_3[0][...
sequential_16 (Sequential)	(None, 128, 128, 64)	262,400	concatenate_5[0]...
concatenate_6 (Concatenate)	(None, 128, 128, 128)	0	sequential_16[0]... sequential_2[0][...
conv2d_transpose_8 (Conv2DTranspose)	(None, 256, 256, 3)	6,147	concatenate_6[0]...

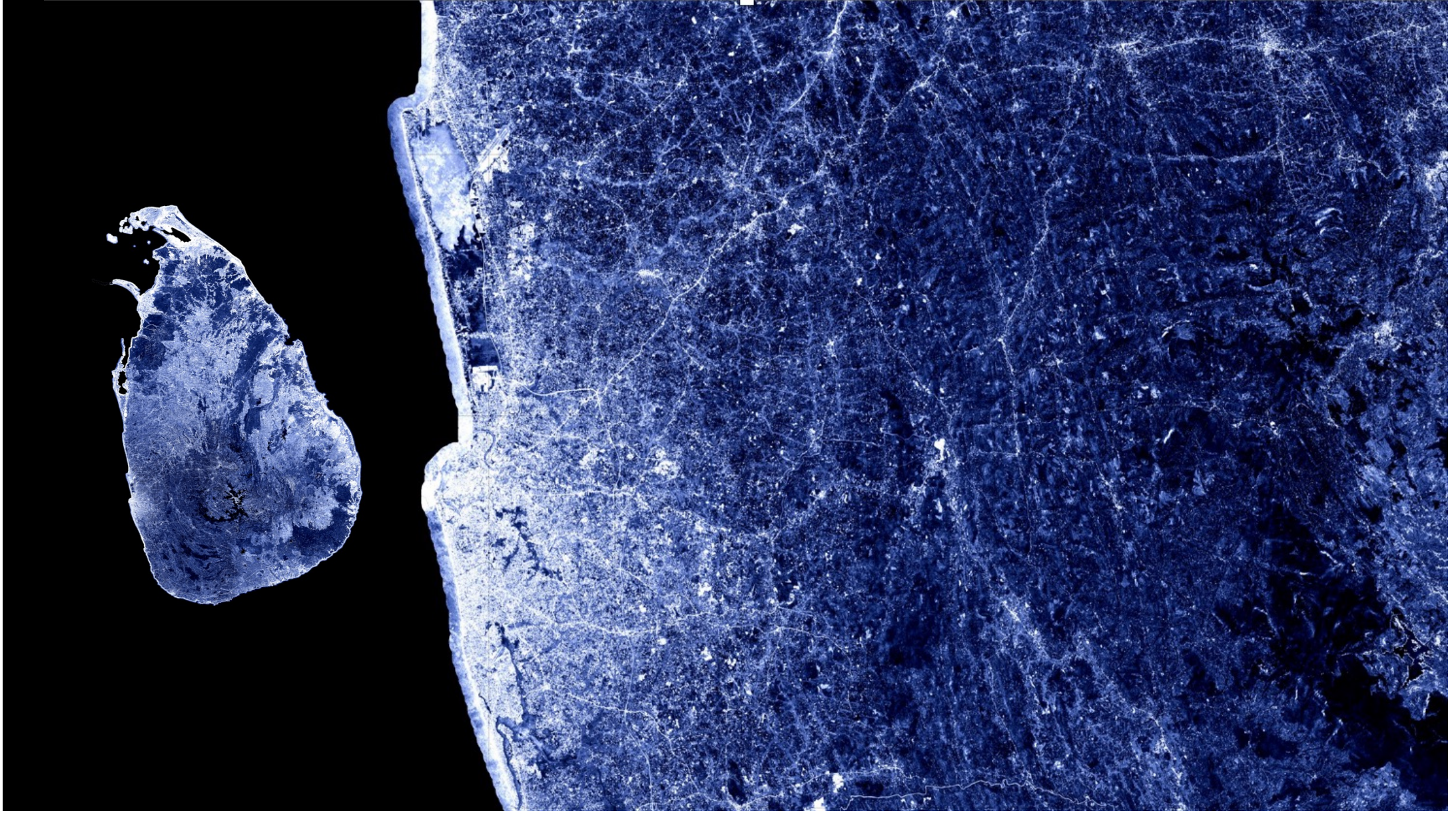
**Total params:** 54,425,859 (207.62 MB)  
**Trainable params:** 54,414,979 (207.58 MB)  
**Non-trainable params:** 10,880 (42.50 KB)

Step: 217000  
Time taken for 1000 steps: 51.54 sec  
Generator Total Loss: 24.5848  
Generator GAN Loss: 3.2271  
Generator L1 Loss: 0.2136  
Discriminator Loss: 0.7397



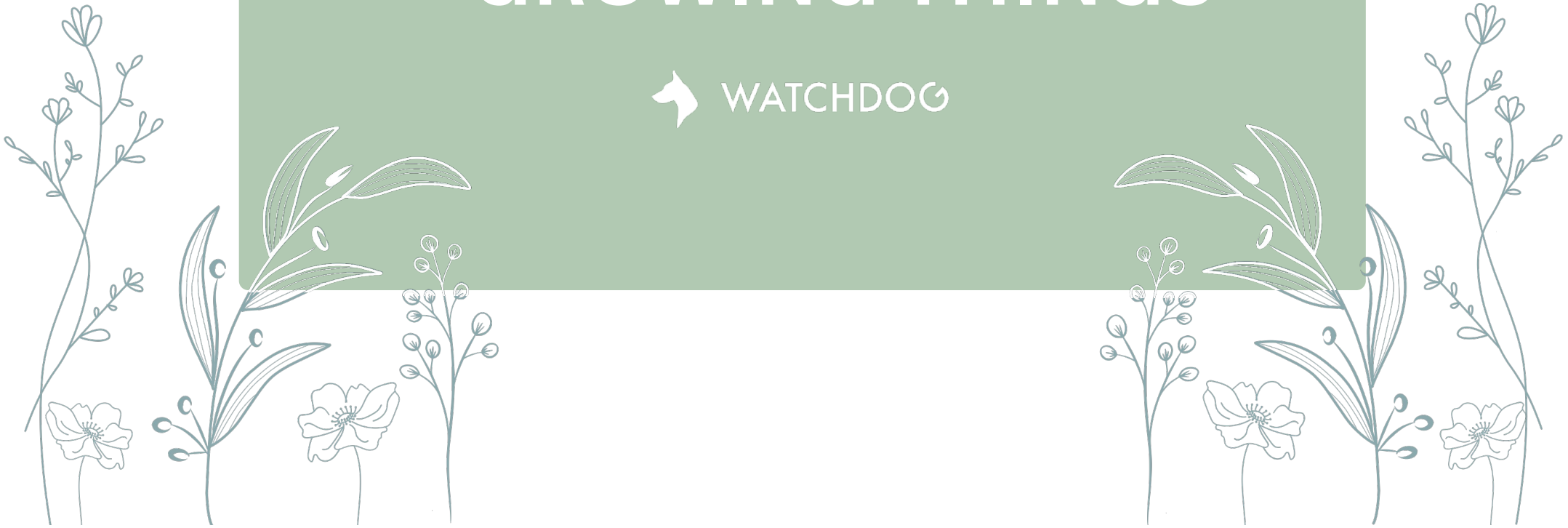








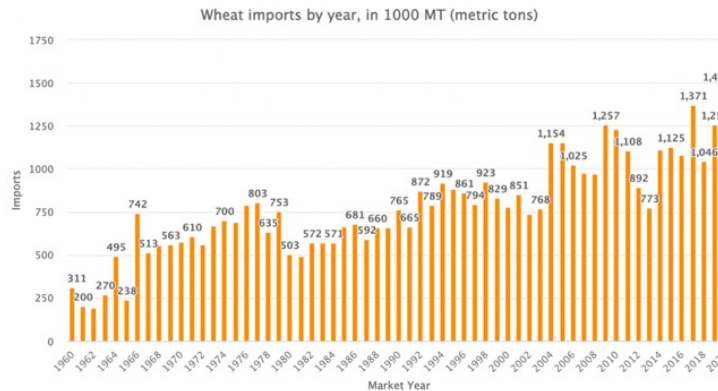
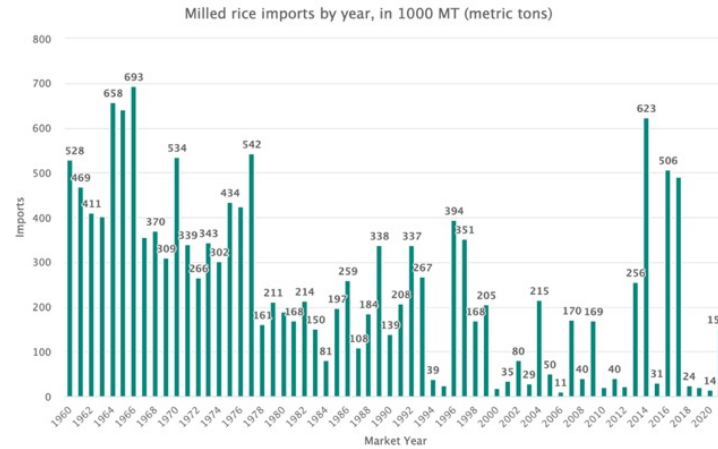
# GROWING THINGS





Most farmers say they sell to middlemen from the rice mills, as opposed to directly to the Paddy Marketing Board. This is mostly because the Board asks them to provide paddy that is dry to a certain degree. Selling the wet paddy to the middleman allows them to charge for a heavier weight, and those agents usually have the required equipment to do the drying. At this point in time however, it is also helpful because agents pick up the sacks of paddy sometimes straight from the paddy field, saving the farmer the fuel they'd have to use to transport them. They would sell it to whoever offers the highest price.

At that moment, a tractor filled with sacks of paddy drives past where we are seated. Behind it, a man on a motorcycle follows closely. **"Now every tractor travels with a guard like that - with the low supply and high prices, people sometimes steal right off the tractor."**



## When the cure costs more than the disease

The unfolding disaster from the lack of food produced - that is slated to get worse - meant the Government took several damage control measures.

**To put it simply, they had to spend a lot of money to make sure people had something to eat.**

- A record of Rs. **95 per kilo** of paddy was paid to farmers, on account of their struggle to cultivate. Shortly after, the Government announced that it would be spending Rs. **40 million** to compensate farmers for the 'crop damages' they experienced.
- **Private sector fertiliser companies demanded the Government settle arrears of Rs. 26 billion** to them **for stocks** they distributed under the subsidy. They needed the money to pay for imports.
- Nano-nitrogen liquid fertilisers **arrived from** India in November 2021, supposedly to **assist farmers** in the Eastern Province.

The Soil Science Society of Sri Lanka noted that public funds of around **Rs. 7,900 million or USD 39 million** was spent on importing the nano fertiliser, without enough information as to its suitability for our crops and environment.

- In February 2020, to address the falling foreign currency issue, **rice imports** had been restricted. The immediate impact of the fertiliser ban saw the need for **the country to resume importing rice**, while its foreign reserves were depleting.
- **Sri Lanka decided to settle 6.7 million dollars to Qingdao Seawin Bio-tech fertiliser company** from which it had ordered organic fertiliser, after the **chaos that ensued** when Sri Lanka's National Plant Quarantine Service (NPQS) claimed that samples of the fertiliser contained harmful bacteria.
- 100,000 MTs of rice from India and 300,000 MTs from Myanmar were to be **imported under an arrangement**. Each ton of rice would cost LKR 126,750/ USD 445, including shipping. **In total, that would cost about Rs. 50 billion, or USD 178 million.**
- On 01 March 2022, the Government announced that it would be paying Rs. 50,000 per hectare to all farmers who had experienced crop damage during the last cultivation

# How much does food cost now?

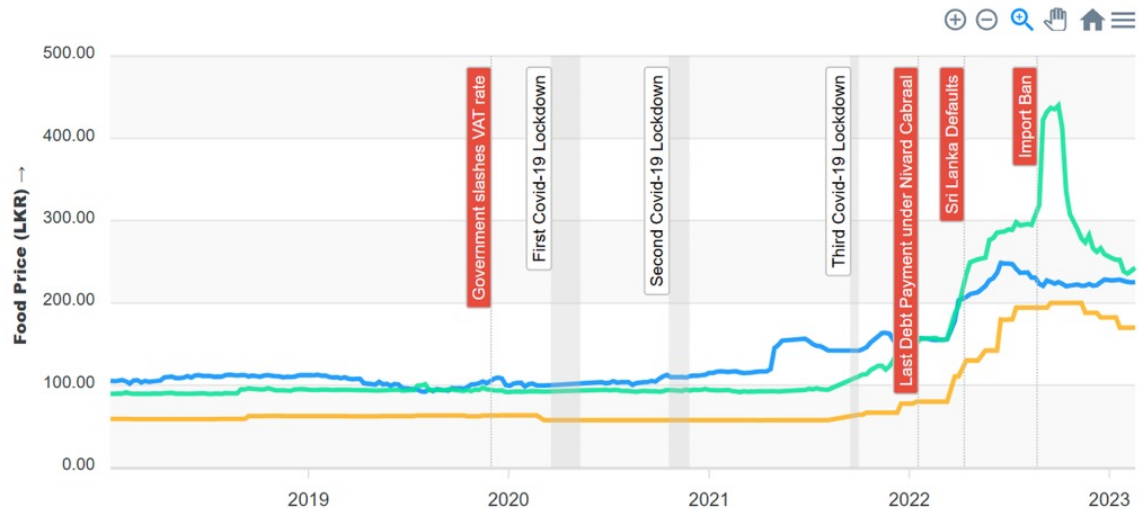
A fluctuating economy means that the cost of living keeps changing. At Watchdog, we decided to put together long-term data on one of our most basic requirements: food.

A project by Ishan Marikar, Rehana Thowfeek, Sachintha Adikari, Umesh Moramudali and Yudhanjaya Wijeratne

- Rice and Curry Index
- Ingredients

- Staple Foods
  - Bread
  - Cowpea Whole - Average
  - Green Gram - Average
  - Kadalai - Average
  - Mysore Dhall - Average
  - Mysore Dhall - No 1. Large
  - Mysore Dhall - No 2. Medium
  - Mysore Dhall - No 3. Small
  - Nadu - Red
  - Nadu - White
  - Nadu - White Imported
  - Ponni Samba - Imported
  - Raw Red - Average
  - Raw Red - Imported

Showing prices for Bread Samba - Average Wheat Flour between 1/1/2017 and 7/22/2024





# AGRI WIKI INTRODUCTION

How do we ensure some level of resilience to policy blunders and system shocks?

How do we learn to grow?



# CROP SELECTION (70)

## VEGETABLES (19)

- Cauliflower
- Knol Khol
- Kohila
- Thumba
- Karawila/Spiny Gourd
- Kekiri/Cooking Melon
- Capsicum
- Bitter Gourd
- Luffa/Chinese Okra
- Okra
- Snake Gourd
- Yard Long Beans
- Winged Beans
- Green Beans
- Corn
- Pumpkin
- Moringa/Drum Stick
- Green Gram
- Egg Plant
- Cucumber

## LEAFY GREENS (8)

- Lettuce
- Cabbage
- Leeks
- Malabar/Spinach
- Kang Kung
- Gotu-kola
- Nivithi
- Thampala

## FRUITS (23)

- Cainito/Star Apple
- Naminam
- Jambu
- Beli
- Dragon Fruit
- Mangosteen
- Rambutan
- Durian
- Jamanaran
- Watermelon
- Avocado
- Woodapple
- Tomato
- Star Fruit
- Pomegranate
- Pineapple
- Passion Fruit
- Papaya
- Mango
- Jackfruit
- Guava
- Bananas
- Ambaralla

## ROOTS (5)

- Potatoes
- Sweet Potatoes
- Carrots
- Beetroot
- Radish

## HERBS & SPICES (9)

- Turmeric
- Mustard
- Lime
- Lemongrass
- Ginger
- Garlic
- Coriander
- Green Chilli
- Red Onion

## FLOWERS (6)

- Sunflowers
- Marigold
- Lavender
- Jasmine
- Cranberry
- Hibiscus
- Cosmos
- Flower



# CROP SELECTION PROCESS

Plants/ crop types for database are selected based on the following criteria:

- Suitability for local climate and soil conditions
- Native species prioritized
- Easy to grow and maintain
- Scalable based on available land or garden space
- Suitable for rural or urban environments
- Perennials for frequent harvesting
- Emphasis on long-term sustainability
- Can be cultivated individually or as a community crop
- Nutrition value for supporting families during food crises



## Content

🏠 Introduction

🌱 First Principles

🔍 Sources

Flowers	+
Fruit	+
Herbs & Spices	+
Leafy Greens	+
Roots	+
Vegetables	+

## Description

A popular citrus fruit cultivated in various regions of Sri Lanka, including the low country, mid-country, and up-country zones. This versatile fruit tree produces round to oval fruits with easy-to-peel skin and sweet, juicy segments that can be eaten fresh or used for juice production. Mandarin orange trees typically yield about 60 kg of fruit per year, with harvests spread throughout the year.

Mandarine fruit is also used for juices and seasonings. Essential oils from the peel are used in aromatherapy. Limonene, its most active ingredient, functions as a natural insect repellent, as well as an anti-bacterial solution

Recommended Varieties:

- **Juicy:** This variety produced by the Horana Fruit Crops Research and Development Institute is recommended for cultivation in the low country region of Sri Lanka. It can be used for fresh fruit and juice production. It bears large fruits weighing between 100-130 grams with light orange color.
- **Madhu:** A mature tree grows about 2-2.5 meters tall with a sprawling canopy. Leaves may be light green or yellowish. The tree is thornless. The fruit is round or oval with slightly protruding ends. Fruits are seedless or may have 1-2 seeds. The juice is light yellow or light orange. Unripe fruit is dark green and may turn light green or yellowish green when ripe. Suitable for Uva and Central Provinces (Middle Zone).
- **Yellow Jamanaran:** There are three varieties - Horana Ehimi 1, 2, and 3. They have yellowish bark, are seedless, and easy to peel. Average fruit weight ranges from 85-120 grams. Trees reach about 1.3-1.5 m height at 4 years with a leaf canopy spread of 1.5-2 m. Fruiting occurs in August-September and March-June. Brix values range from 11.4-12.5. Suitable for Uva and Central Provinces (Middle Zone).
- **Jamanarang-Ind:** Grows 2-2.5 meters tall in 4 years with a leaf canopy spread of 2-3 m. Average fruit weight is about 90-120 grams. The bark peels off easily. The flesh is bright orange when ripe. There are about 2-8 seeds per fruit. It has a sweet taste. Suitable for the low country wet zone.



Image - Mandarin Citrus, by pieonane, Pixabay

## Jamanaran

**Generic name:** Mandarin Orange

**Sri Lankan names:** Jamanaran (Sinhala) | Narangam (Tamil)

**Scientific name:** *Citrus reticulata*

**Plant family:** Rutaceae

**Edible parts:** Fruit

**Nutrition value:** Rich in vitamin C. And 100g contains 53 calories on average

### Difficulty rating

**Low country wet zone**

Difficulty: ★★★★★

**Explanation:** Adequate rainfall and temperature, but high humidity increases disease risk.

# FIRST PRINCIPLES

## First Principles (WIP)

Tineeka De Silva updated about 1 year ago • Viewed by 4 people • Comment

A note to start with: much of this knowledge is distributed very widely; some of the best seem to be video c Basic steps as distilled here:

### One: Building soil and compost



Everything we've seen and read and everyone we've spoken to talk about the importance of building soil. TI down into a few things we can do:

1. Collect and dump lots of organic matter into soil, mix well, let it decompose (ie: compost)
2. Grow nitrogen-fixing crops that pump the soil full of nitrates (which other plants need to grow); set up cy these nitrogen-fixers help grow garden crops and those garden crops keep us supplied with compost.

Our most likely path seems to be:

1. First set up a compost-building zone in your garden. This should be at least 1 meters square, but pref meters square.
2. Make a hot compost.

First, buy or collect as much dry organic matter as possible. These can be leaves, shredded paper, choppe coconut husks, wood chips. Add soil, manure, water, and mix thoroughly, then start the serious layering: : eight inches of dry organic matter, followed by two or three of green (living organic matter), then more s manure. sprinkling of the soil options. Water generously before starting the next layer. Keep building unt reaches three to four feet high.

Hot composting has a specific method and can yield you a compost in a month. Instructions here: <https://deepgreenpermaculture.com/2010/05/08/hot-compost-composting-in-18-days/>



### Three: interim harvests: fast-growing stuff for easy food

...the main crops above grow, you should also have a few things that you can eat inside of a month. Many of : the greens from crops above.

- greens
- id Sunflower Shoots
- .ettuce
- Root Crops
- Greens



### : Upgrading: flowers, companion plants and fruit

ems to be a lot on how flowers help pollinate, prevent pests from attacking vegetable crops. This will require al research into which flowers grow here, [including this long list](#). I'll upgrade this section as I learn more.

ep, we should be upgrading the crops and planting fruit trees. Fortunately, we have plenty of fruit to choose ingo, papaya, pineapple, avocado, banana, watermelon, rambutan, mangosteen, wood apple, guava, inate and jackfruits.

ll take time to grow but will keep yielding for a long time, not to mention providing shade for the garden.

### rences for this document

[www.countryliving.com/gardening/news/g4188/companion-planting/](http://www.countryliving.com/gardening/news/g4188/companion-planting/)

[www.thespruce.com/companion-planting-with-chart-5025124](http://www.thespruce.com/companion-planting-with-chart-5025124)

[www.allaboutgardening.com/carrot-companion-plants/](http://www.allaboutgardening.com/carrot-companion-plants/)

[www.thespruce.com/companion-plants-for-potatoes-2540039](http://www.thespruce.com/companion-plants-for-potatoes-2540039)



## How do we know what planting/growing conditions are?

We're building a DIY sensor tailored for farmers, enabling them to monitor crucial environmental factors like light intensity, humidity, temperature, and soil moisture.

We're designing it to be easily built by tech-savvy individuals using widely available and beginner-friendly components.

The goal is to ensure the sensor network is simple, robust, and requires minimal user intervention once deployed in the field, operating efficiently for extended periods.

### Planting requirements

Planting season:

#### Planting conditions

**i** The sweet potato plant can adapt to diverse rainfall patterns and soil types. However, it is susceptible to cold temperatures and excessive water in the root zone, which can be fatal to the crop.

Propagation	Plant cuttings - recommended. Plant within 4 days of cutting. Small slips that sprouts directly from a sweet potato can also be planted. Fresh sweet potato seeds also germinate relatively easily but are harder to find.
Planting method	Planting requires a depth of 25 cm for better soil aeration and drainage. In the ridge and furrow system, maintain a distance of 90 cm between furrows and 20 cm between plants. For beds, prepare them with a width of 60 cm and keep a distance of 20 cm between plants.
Soil	Sandy/ loam soil with good drainage is suitable. If your soil is clay, rocky, or compacted, it is recommended to consider growing plants in raised beds. Focus on developing fertile, well-draining soil for optimal root growth.
Water	Keep soil evenly moist. At the crop initial growth stage water supply is important
Light	Requires full sunlight for optimal growth. Plant in an area that receives abundant sunlight. Under shaded conditions, both leaf and root production decrease, and the plant tends to climb to seek sunlight. This results in larger but fewer leaves, and fewer tubers are produced in shady conditions. Heavy shade is not tolerated well by the plant, although some varieties may tolerate mild shade.
Fertiliser / Mulch	Enhance soil quality with compost and coconut coir Avoid animal/bird manure and heavy nitrogen fertilisers

#### Growing conditions

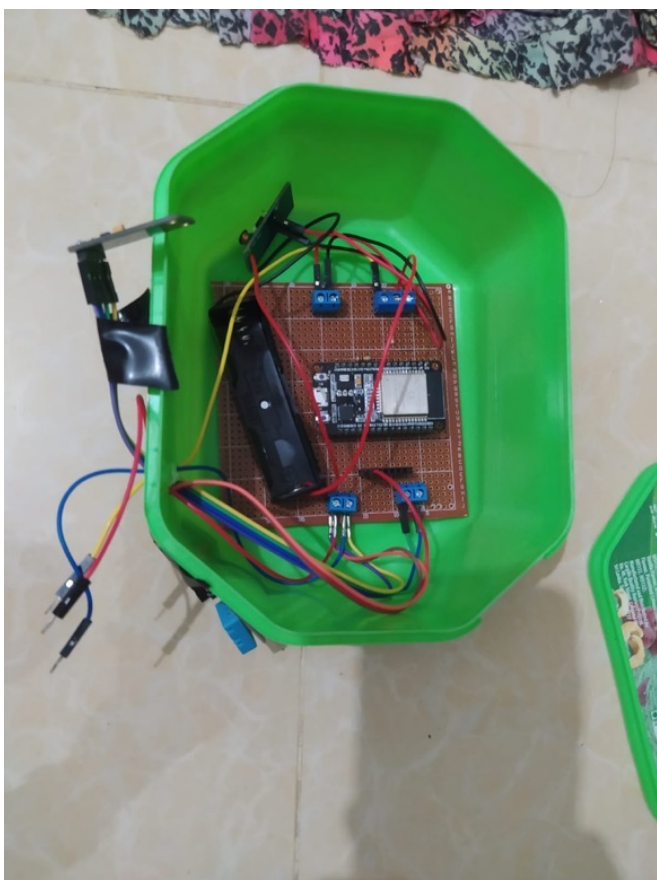
Temperatures	This plant grows well with temperatures between 21 to 26°C
Soil	pH between 5.2 to 6.8
Water	Excess water reduces tuber production. The equivalent of one inch of water weekly is sufficient. Apply to roots
Pruning	Prune plants regularly to maintain their desired size and shape. When plants are pinched or trimmed, it promotes new growth
Weed control	It is important to remove weeds at early stage of the crop, to reduce plant competition

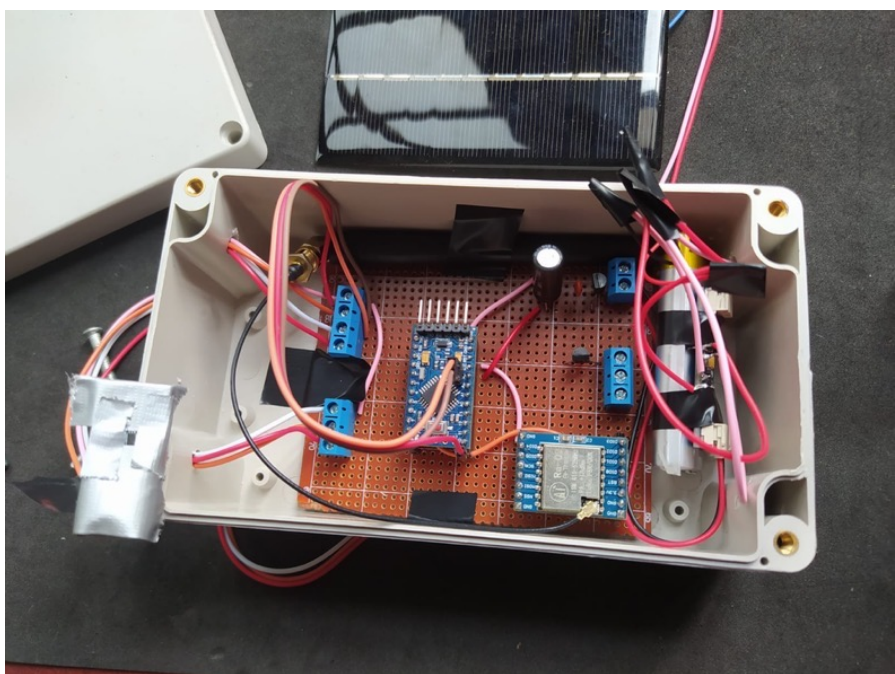
#### Harvesting



Field-deployed nodes collect data, transmitted to a central gateway node. The gateway node uploads this data to a time-series database for storage and analysis.

- **Humidity, soil moisture, light intensity, temperature**, accessible on your phone.
- **LoRA for very long-range transmission:** technically up to 15km, but we've tested 1km so far.
- **Solar power** : so that it's as close to plant-and-forget as possible within budgets
- **Built with low-cost, locally available hardware**

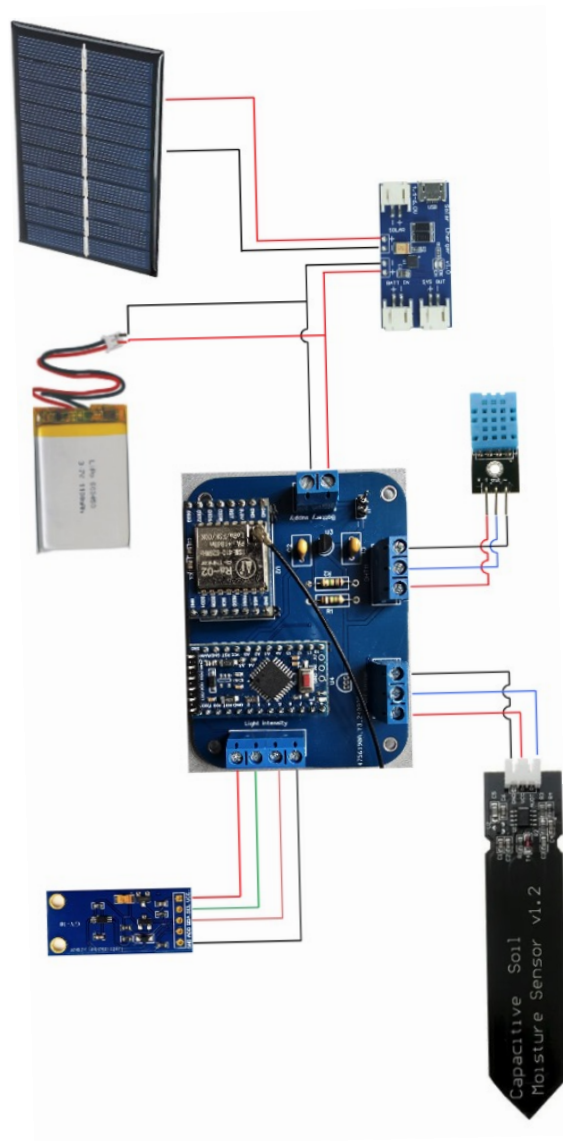












- **Self-Replenishing Power:** The module includes a mechanism to recharge its battery, reducing the need for frequent intervention.
- **Minimal Maintenance:** Once deployed, the module is intended to function with minimal human intervention.

## Components Required

- Arduino Pro Mini 3.3V 8MHz board x 1 (Rs.950)
- DHT11 temperature and humidity sensor x 1 (Rs.230)
- BH1750FVI light intensity sensor x 1 (Rs.450)
- 2N7000 MOSFET x 1 (Rs.20)
- 1M ohm resistors x 2 (Rs.10)
- LiPo battery (<1000mAh) x 1 (Rs.1500)
- CN3065 solar charger module x 1 (Rs.400)
- 6V 1W mini solar panel x 1 (Rs.400)
- MCP1700T-3302E/TT voltage regulator x 1 (Rs.230)
- 1uF ceramic capacitors x 2 (Rs.4)
- LoRa Ra-02 module x 1 (Rs.1450)
- Perforated board (dot board) x 1 (Rs.200)
- Wires in 4 colors (Rs.200)
- Female pin header bars x 2 (Rs.50)
- TTL converter (Rs.420)
- USB Mini cable (Rs.100)

Costs as of 2024 in Sri Lanka

## Design Considerations

The **Arduino Pro Mini 3.3V 8MHz** development board is an ideal choice for this project due to its microcontroller, which reduces unnecessary power consumption. However, it does have two significant power-consumption issues: the onboard voltage regulator and the power LED.

12:37 **DEBUG**

**Sensors** ESP32

### Carrot Patch

The sensor node is positioned in a 12ft x 12ft carrot patch, located near the back of the field adjacent to the potato patch.

Last Update: 11-06-2024 19:55:45 | No. Data: 16

**LATEST READINGS**

Temp	Humid	LUX	Soil
26.0C	29.0%	3430.0lux	21.0%

### Tomatoes Patch

Tomato patch of 10ft x10ft left of the house

Last Update: 11-06-2024 19:55:45 | No. Data: 16

**LATEST READINGS**

Temp	Humid	LUX	Soil
25.0C	39.0%	595.0lux	76.0%

### Cabbage Patch

Cabbage patch located to the left of the house

Last Update: 11-06-2024 19:55:45 | No. Data: 16

**LATEST READINGS**

Temp	Humid	LUX	Soil
25.0C	69.0%	223.0lux	55.0%

**Receiver**

last sync: 16:51 Connect

**×** **Save**

Select a date range

Jun 25 – Jul 22

S M T W T F S

June 2024

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July 2024

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

12:37 **DEBUG**

**← Carrot Patch**

The sensor node is positioned in a 12ft x 12ft carrot patch, located near the back of the field adjacent to the potato patch.

Last Update: 19:55:45 | First Update: 18:12:57 | No. Data: 16

**TIME RANGE**

24h 7d 30d **Custom**

### Temperature

Critical factor in agriculture, affecting plant growth, development, and yield, as well as influencing soil properties, water availability, and the prevalence of pests and diseases.

Date	Temperature
Jun 1	0
Jun 11	11
Jun 21	0

### Humidity

Plays a crucial role in agriculture by influencing plant growth, transpiration, and the development of pests and diseases.

Date	Humidity
Jun 1	20
Jun 11	30
Jun 21	20





# LAST STEPS: EXTENDING THE MISSION

Online course in factchecking



WATCHDOG