Studying Weather Data for the Development of Innovative Pepper Hybrid Drying Machine.

P C S H S T R G

All Graphics/Photos/Images/Charts/Tables created by researchers, Customs Department, Weather Station Trang, Department of Intellectual Property, Thairath Online and CANVA.

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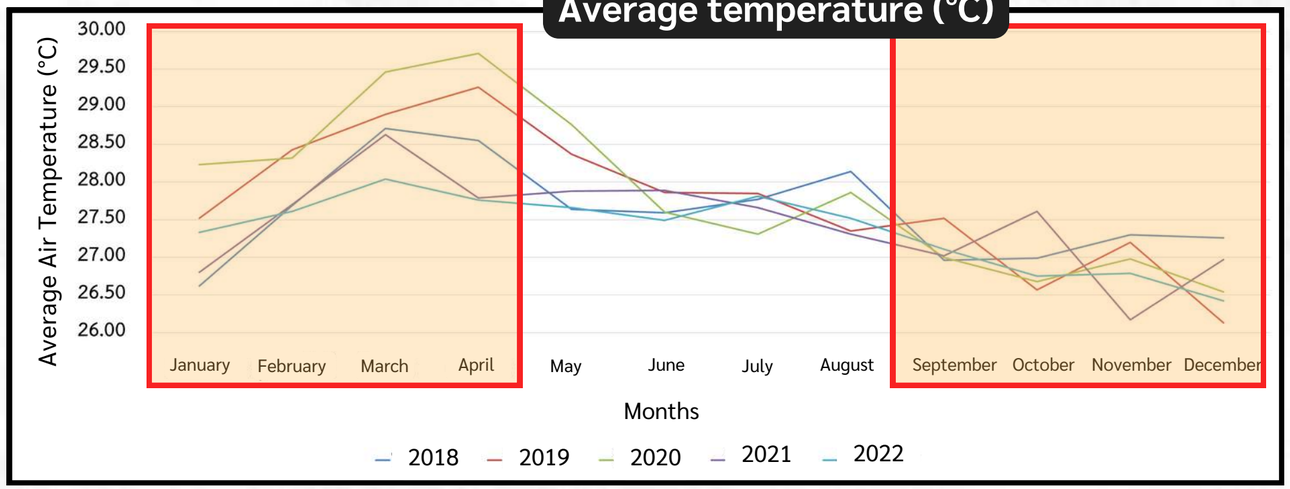
Palian pepper

General drying pepper methods

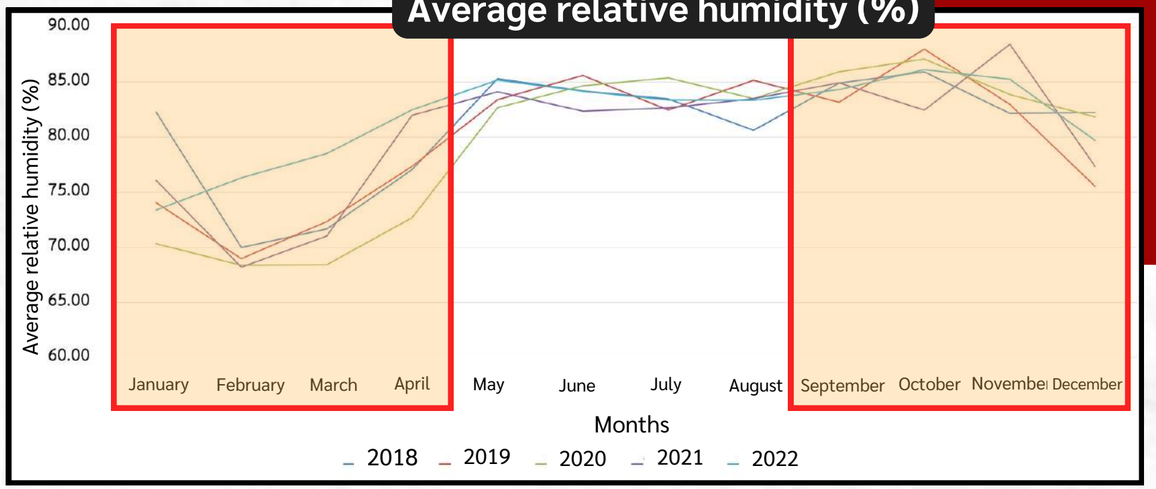
Dried red pepper with sunlight

Weather conditions in Trang Province for the past 5 years (2018 - 2022)

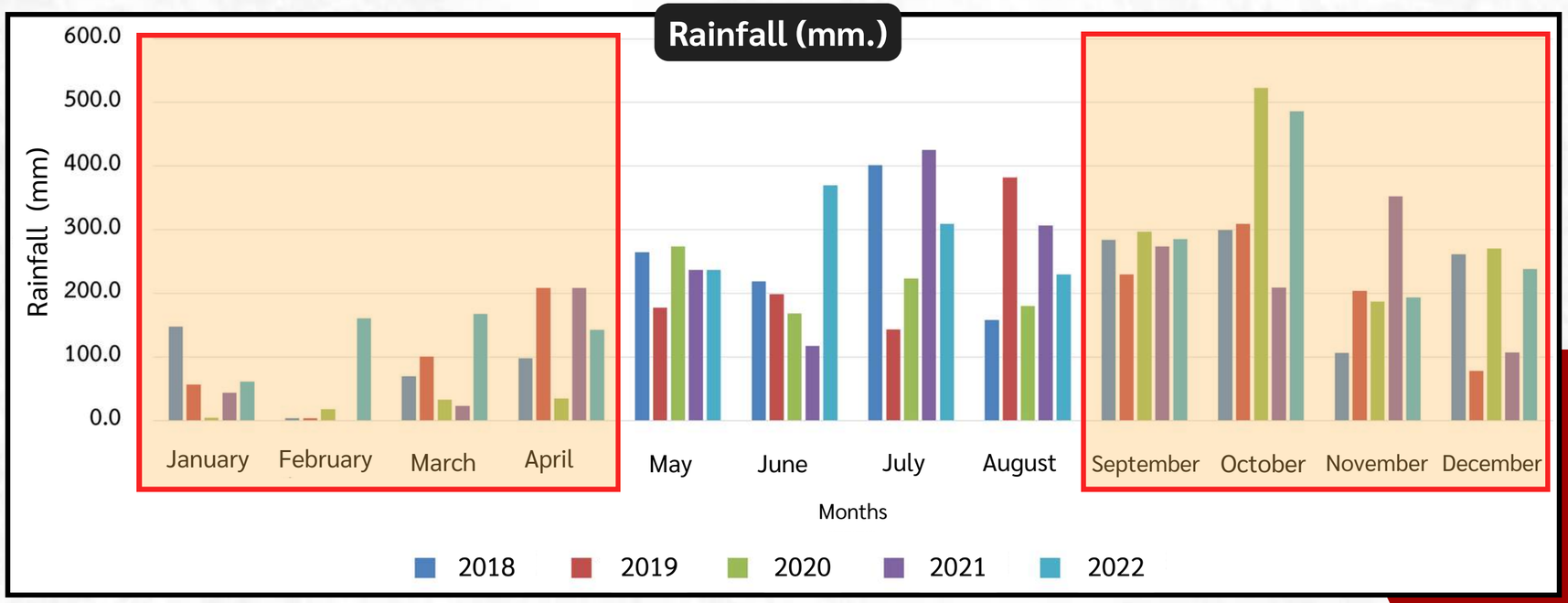
Average temperature (°C)



Average relative humidity (%)



Rainfall (mm.)



Source : Weather Station Trang

Research questions

1) Does the Trang province’s weather have an affect on the pepper drying process?

2) Does the developed innovation have the capability of drying pepper?

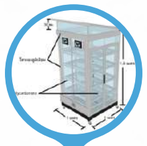
Objective

1. To study weather information including air temperature, relative humidity and rainfall on Trang Province
2. To design and develop an innovative pepper drying cabinet.
3. To assessing the efficiency of innovative pepper drying cabinet

Methods

Survey

Analyze an issues



Design an innovation

Develop

Efficiency Test

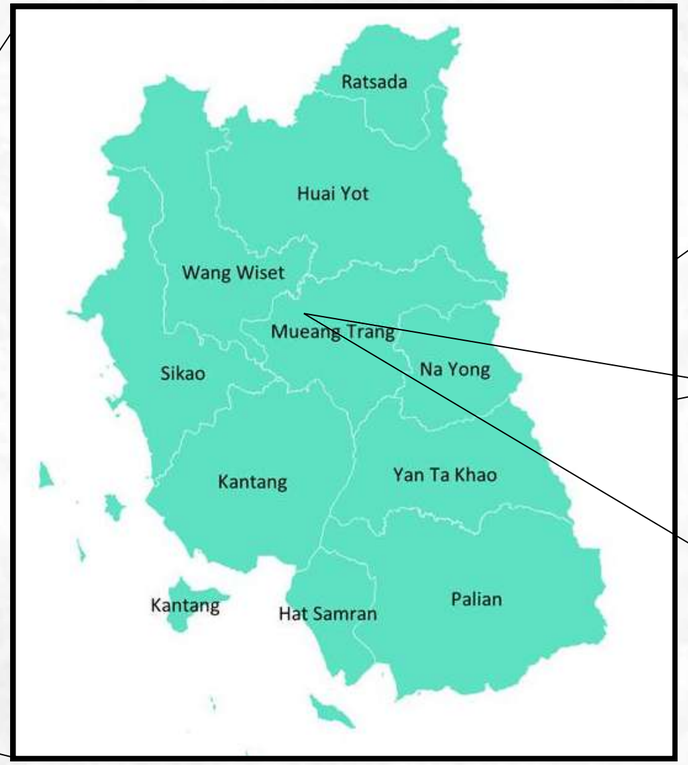
- **Assessing the efficiency of innovation**
  - Temperature
  - Relative humidity
  - Illuminance
- **Testing the quality of pepper**
  - Seed moisture content
  - The percentage of weight remaining
  - Odor sensitivity
  - Color of pepper before and after drying

Ask for suggestions

Practical Innovation

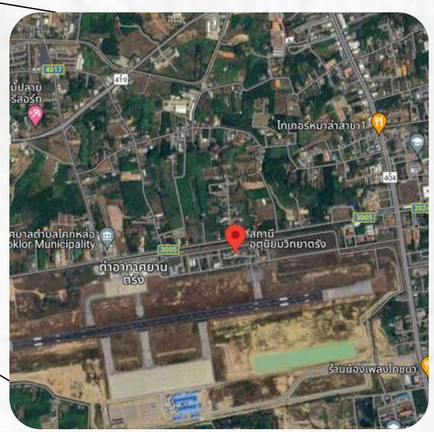
Study sites

https://www.thairath.co.th/



http://www.kitmaiwatpho.com/

Bansuan Heritage Trang Pepper,Yan Ta Khao District, Trang Province



Weather Station Trang , Mueang Trang District, Trang Province

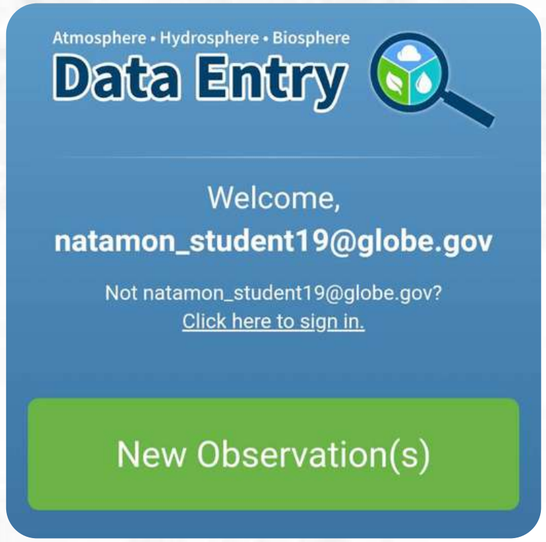
Source : Google Earth

Set a 2 study sites for collecting weather data, such as temperature, humidity, and rainfall: Baansuan Heritage Trang Pepper and Weather Station Trang.

Weather data collection

1

Collecting weather data from 2 study sites
1. Weather station Trang
2. Bansuan Heritage Trang pepper



2

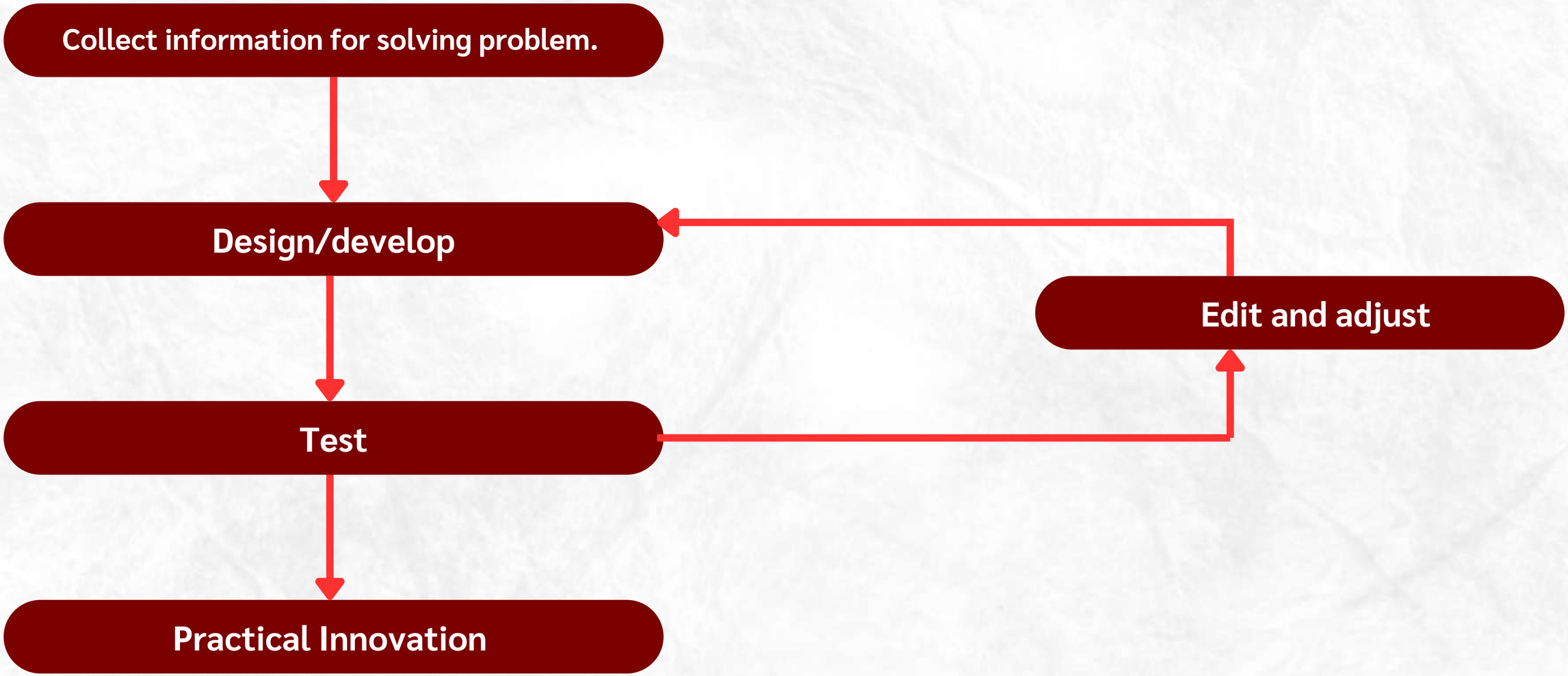
Send data to data entry

https://e-training.tpqi.go.th/

3

Analyze the data

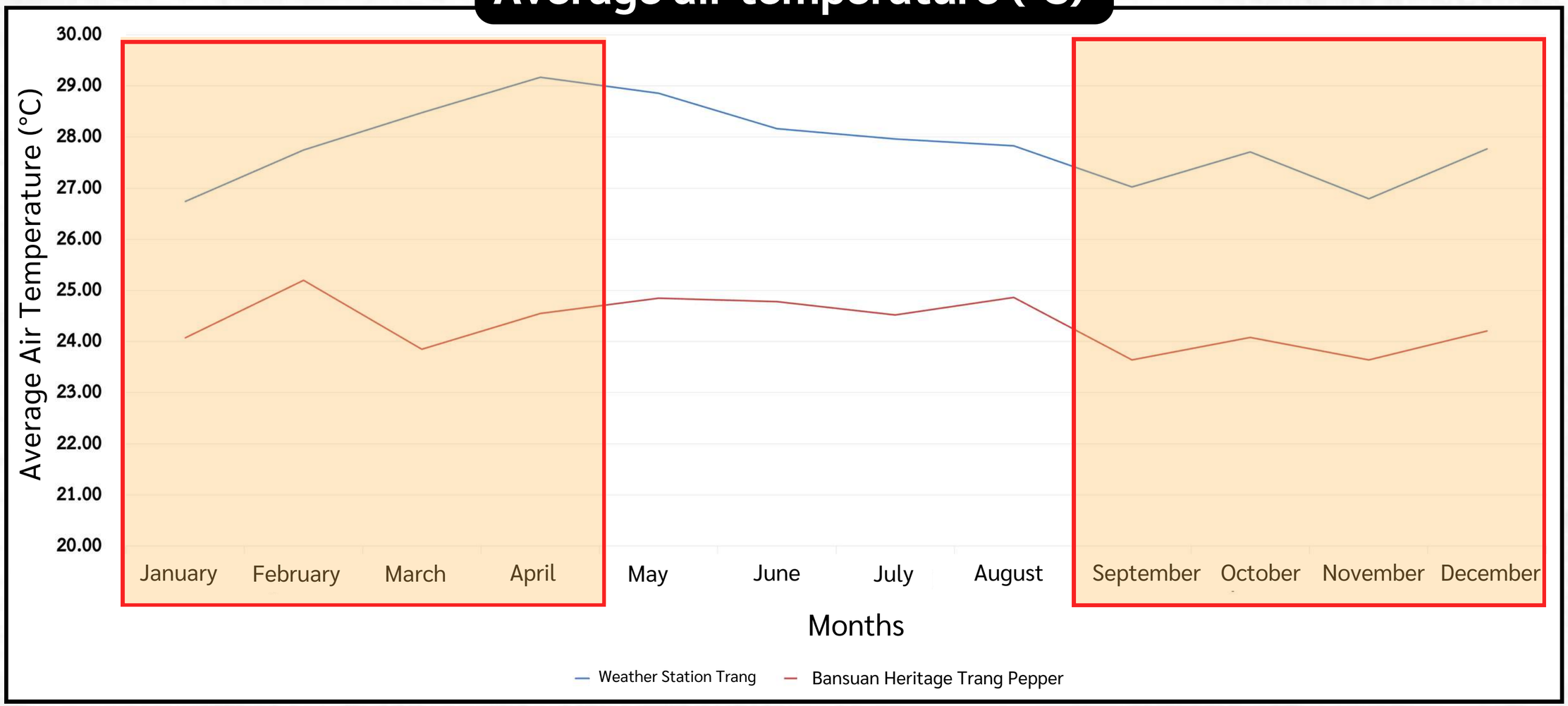
Engineering process



Part 1 Studying of weather data

between January 2023 - December 2023 on 2 study sites

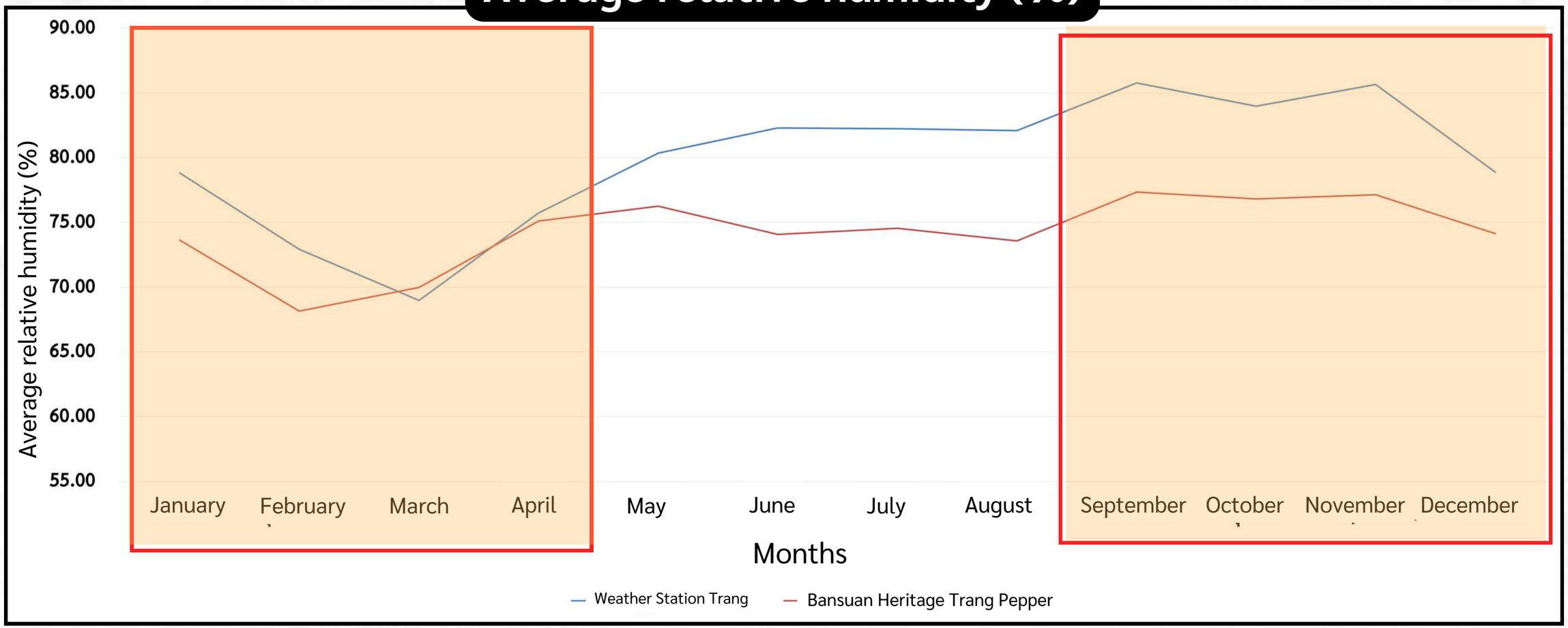
Average air temperature (°C)



Part 1 Studying of weather data

between January 2023 - December 2023 on 2 study sites

Average relative humidity (%)



Part 1 Studying of weather data

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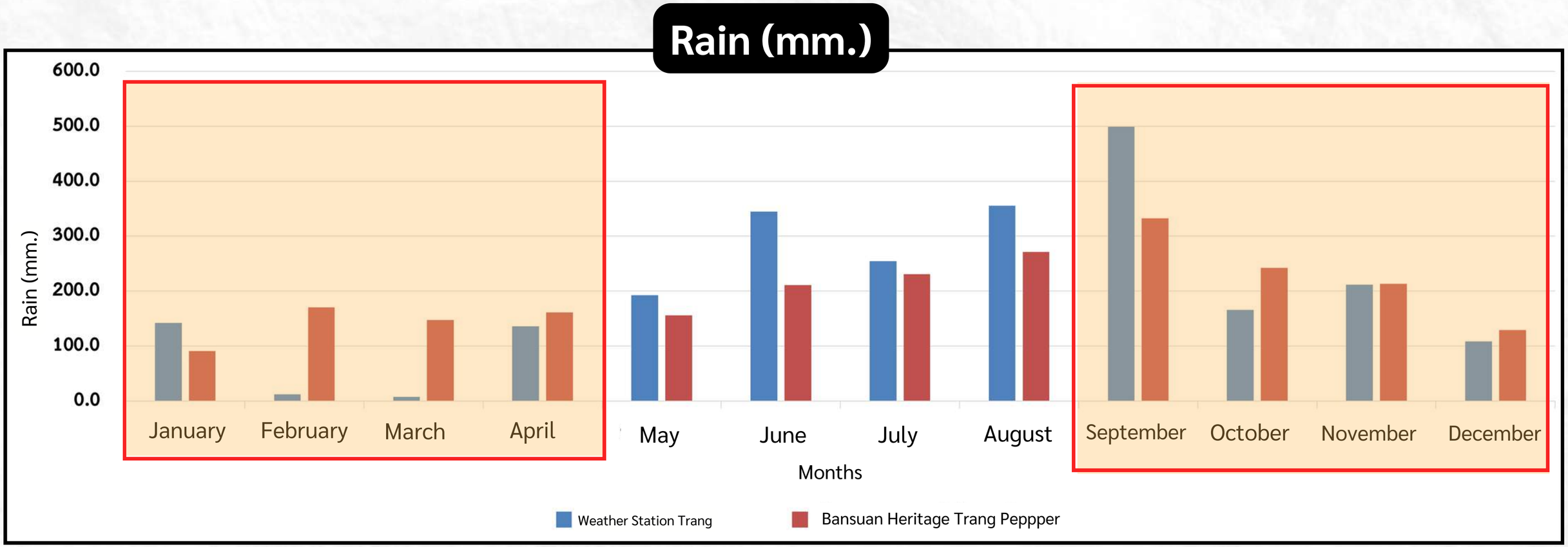
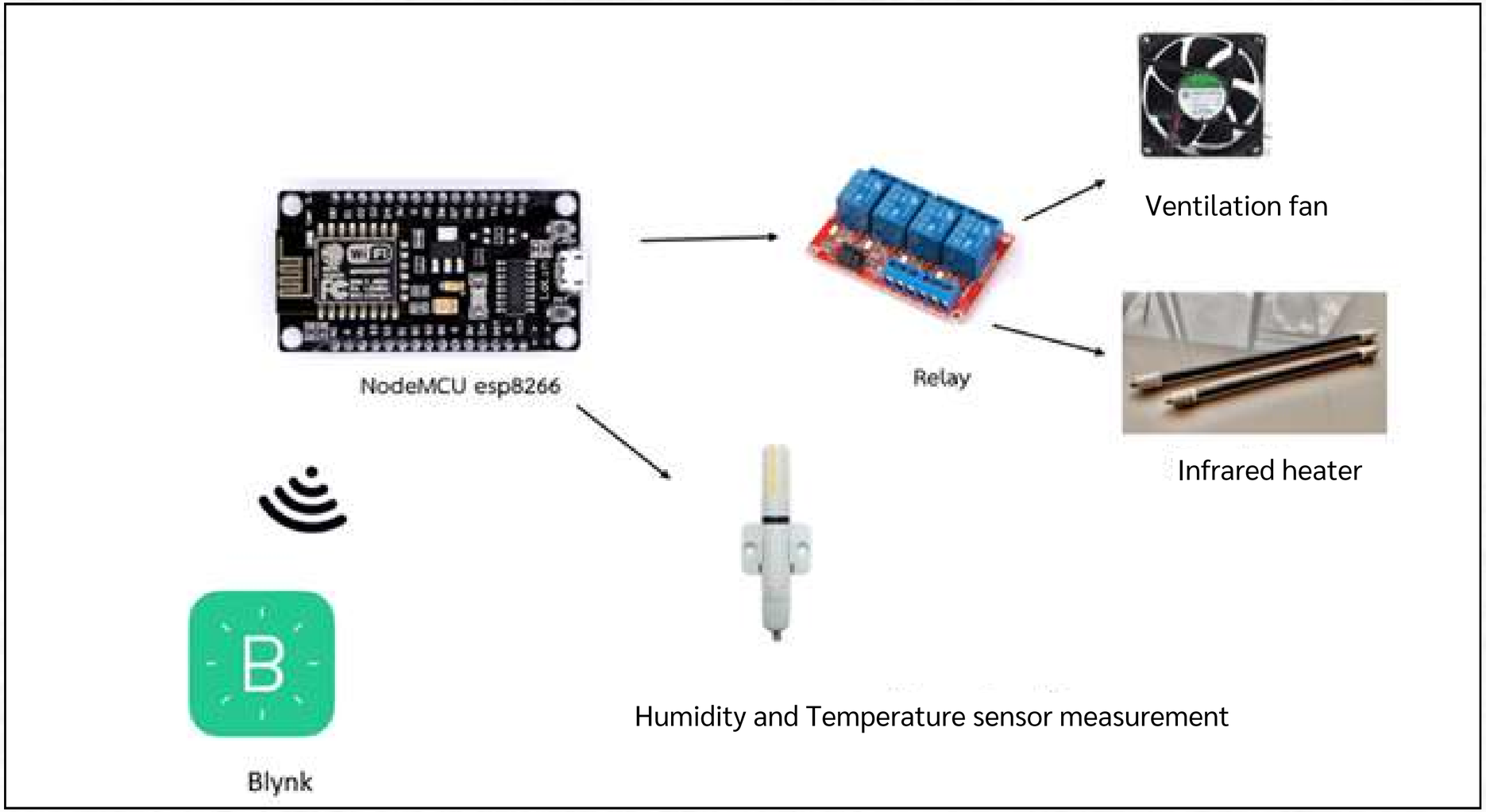


Part 2: Development of Innovation

Cabinet’s draft

Part 2: Development of Innovation

Temperature and humidity control system and IoT system’s Draft



Part 2: Development of Innovation

Completed Innovation!

Procedure

1

Sort 12 kg of peppers into 4 colors.

2

Drying process

Procedure

Assessing the efficiency of innovation

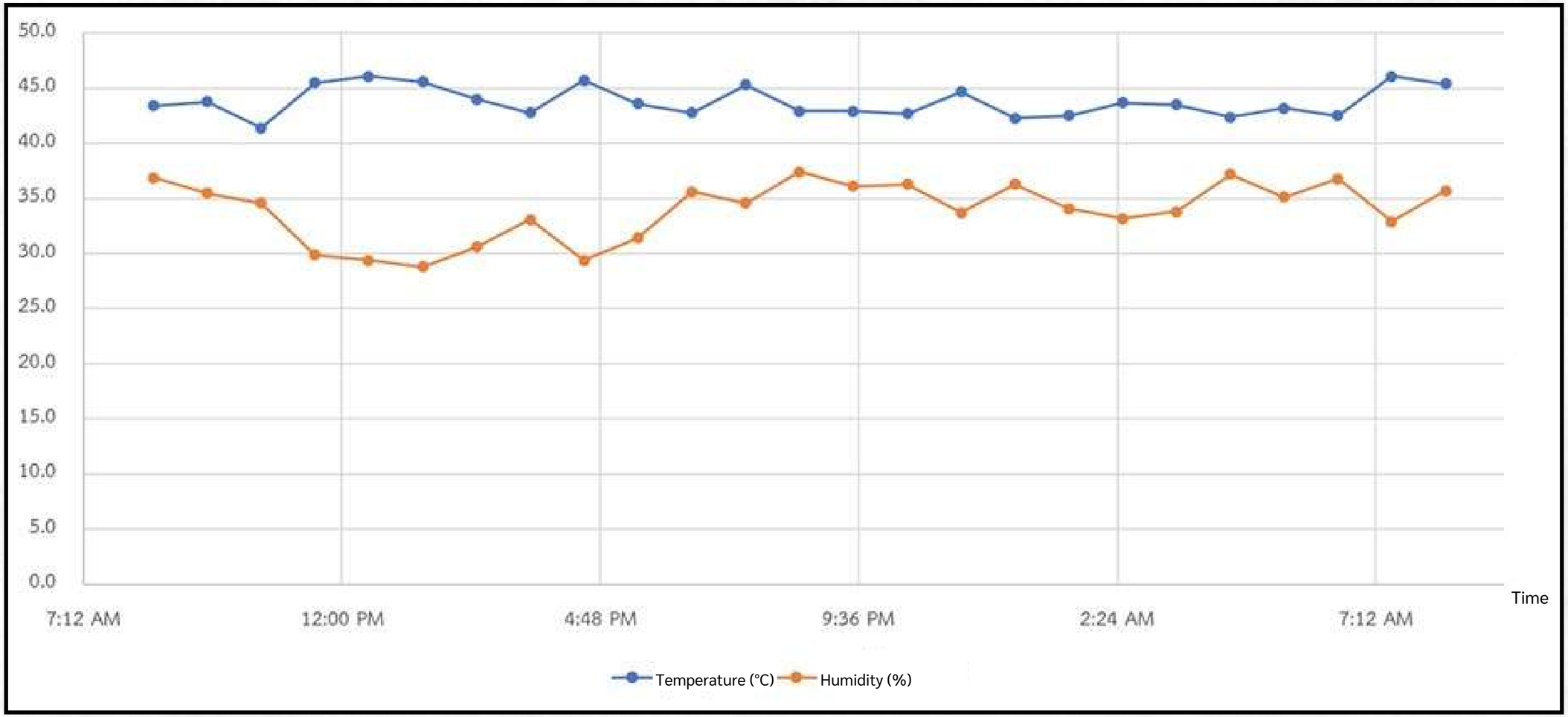
- Measuring temperature inside and outside the cabinet
- Measuring illuminance inside the cabinet

Testing the quality of pepper through drying process

- Measuring the pepper seed moisture content
- Measure the percentage of remaining weight of pepper
- Measuring the quality of pepper odor sensitivity
- Measuring color of pepper before and after drying

Part 3.1: Assessing the efficiency of innovation

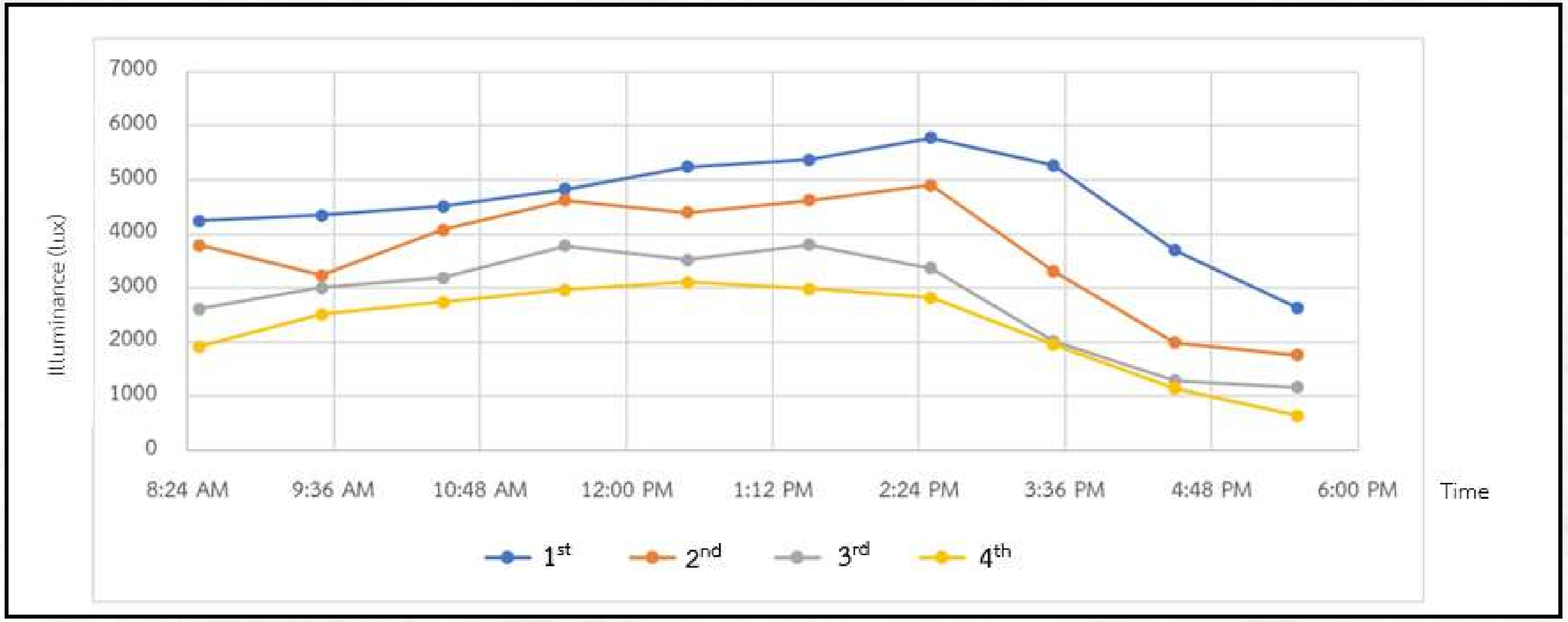
The results of temperature and relative humidity inside the cabinet. every hour, throughout a 24-hour period of each layer.



The results show that the temperature inside the cabinet within the range of 41.4 – 46.1°C and the relative humidity within the range of 28.8 – 37.4%, which is appropriate for drying pepper process. (Atchara Saekow, 2555)

Part 3.1: Assessing the efficiency of innovation

The results of illuminance within the cabinet every hour from 08.30 AM to 15.30 PM



A study of illuminance within the cabinet was found that the illuminance inside the cabinet within the range of 1,550-4,220 lux, which is appropriate for drying pepper (Sarayut Maolee, 2564)

Part 3.2: Results of testing the quality of pepper through drying process with developed cabinet

Table 1: Shows the color of pepper seeds before and after drying

Color	Color Code				
	Before drying	After drying			
		1st Layer	2nd Layer	3rd Layer	4th Layer
Green	0648	1069	1069	0908	0964
Yellow	0428	0473	0543	0542	0473
Orange	0527	0557	0557	0557	0557
Red	0556	0354	0300	0557	0312

Part 3.2: Results of testing the quality of pepper through drying process with developed cabinet

Table 2: Shows the seed moisture content after drying

Color	Seed moisture content (%)				
	1st Layer	2nd Layer	3rd Layer	4th Layer	Average
Green	5.9	5.8	5.7	5.2	5.7±0.3
Yellow	5.3	5.2	4.8	4.6	5.0±0.3
Orange	5.3	5.3	5.1	4.7	5.1±0.2
Red	5.8	5.6	5.5	4.5	5.4±0.5
Average	5.6±0.3	5.5±0.2	5.3±0.3	4.8±0.3	

Pepper seed moisture content after drying passed the requirements. (less than 12%)

Part 3.2: Results of testing the quality of pepper through drying process with developed cabinet

Table 3: Shows the remaining weight of pepper after drying.

Color	Weight remaining (%)				
	1st Layer	2nd Layer	3rd Layer	4th Layer	Average
Green	41.55	41.27	41.76	39.94	41.13±0.71
Yellow	42.27	44.62	41.37	40.46	42.18±1.55
Orange	42.29	45.11	44.84	44.30	44.13±1.10
Red	45.78	45.68	46.17	44.79	45.61±0.50

Part 3.2: Results of testing the quality of pepper through drying process with developed cabinet

Table 4: Shows the odor sensitivity of pepper

Color	Odor
Green	None of Berry-fragrant
Yellow	Subtle Berry-fragrant
Orange	Distinct Berry-fragrant
Red	Distinct Berry-fragrant

1. By studying the weather conditions of Bansuan Heritage Trang Pepper and Weather Station Trang found that the temperature was low, humidity was high level and there was a lot of rain during the harvest season, which affeced the pepper drying process

2. The pepper hybrid drying machine may be used to dry peppers within acceptable limits for industrial requirements.

Acknowledgments

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Princess Chulabhorn Science High School Trang

Bansuan Heritage Trang Pepper

- The designed drying cabinet effectively enhances the quality of pepper

- Increases income and improves the overall livelihood of small-scale farmers.

Reference documents

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