SkyWatch Tanzania

Crowd-Sourced Weather Station Network

Complete Non-Code Project Guide

(Ready to copy into Word – 100 % safe for submission)

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Project Title: SkyWatch Tanzania – A Nationwide IoT Weather Monitoring System

Date: November 2025

1. What the Project Is (Explain to anyone in 30 seconds)

Hundreds or thousands of small, cheap weather stations are placed in schools, farms, villages, and homes all over Tanzania. Each station automatically measures temperature, rainfall, humidity, wind, pressure, and soil moisture every few minutes. All the data is collected in one big central database so that farmers get rain alerts, schools teach real science, meteorologists get better forecasts, and the government can warn about floods or drought.

2. The Six Tables You Will Have (Simple English)

Table Name	What it holds in real life	Expected records
stations	All weather stations	500 – 10,000
locations	GPS positions	Same as stations
sensors	Sensors per station	4 – 10 per station
weather_readings	All measurements	50 – 300 million
daily_summaries	One summary per station/day	~3 million/year
alerts	Warning messages	Thousands

3. Every Column Explained (Plain Language – No Technical Words)

Table 1 → stations

Column	Meaning	Example
station_id	Unique number for the station	3721
station_name	Name you give it	St. Mary's Secondary School – Arusha
owner_name	Responsible person	Francis Masanja
owner_phone	Phone for alerts	+255 765 432 109
installed_date	Installation day	15 May 2025
is_active	Still working?	Yes

Table 2 → locations

Column	Meaning	Example
location_id	Unique number	3721
station_id	Linked station	3721
latitude	North–south GPS	-6.8161
longitude	East–west GPS	39.2833
altitude_m	Height in metres	15
place_name	Area name	Mburahati, Dar es Salaam

Table 3 → sensors

Column	Meaning	Example
sensor_id	Unique number	15842
station_id	Belonging station	3721
sensor_type	What it measures	temperature

model	Sensor name	DHT22
last_calibrated	Last accuracy check	01 October 2025

Table 4 → weather_readings

Column	Meaning	Example
reading_id	Row number	127 483 921
sensor_id	Source sensor	15842
recorded_at	Date & time	27 Nov 2025 14:30
temperature_c	Temperature (°C)	28.40
humidity_percent	Humidity (%)	74.20
pressure_hpa	Air pressure	1010.8
rain_mm	Rainfall	2.50
wind_speed_kmh	Wind speed	12.6
soil_moisture	Soil wetness	38

Table 5 → daily_summaries

Column	Meaning	Example
summary_id	Unique number	84 291
station_id	Station	3721
date	Day	27 Nov 2025
min_temp	Lowest temperature	19.8
max_temp	Highest temperature	31.2
total_rain_mm	Total rain	18.50
avg_humidity	Average humidity	71.4

Table 6 → alerts

Column	Meaning	Example

alert_id	Unique number	5921
station_id	Station	3721
alert_type	Warning type	heavy_rain
message	Message text	Mvua kubwa inakuja leo – linda mazao yako!
sent_at	Time sent	27 Nov 2025 06:15
acknowledged	Seen?	Yes

4. How Everything Connects

One station → has one location → has many sensors → sensors send millions of weather_readings → system creates daily_summaries → system creates alerts when needed.

5. Expected Size After One Year of Real Use

Table	Rows after 12 months
stations	2,500
locations	2,500
sensors	15,000
weather_readings	150 – 250 million
daily_summaries	~900,000
alerts	8,000 – 20,000