**Firebase Setup Guide (for Smart Agriculture System)**

**Step 1: Create a Firebase Project**

1. Go to [Firebase Console](https://console.firebase.google.com/).
2. Click **"Add Project"** and give it a name (e.g., SmartAgriSystem).
3. Disable Google Analytics for this project (optional) and click **"Create"**.

**Step 2: Add a Realtime Database**

1. In the Firebase dashboard, go to **Build > Realtime Database**.
2. Click **“Create Database”**.
3. Choose a location (e.g., asia-south1 if you're in India) and click **Next**.
4. Start in **test mode** (we’ll change the rules later).

**Step 3: Add a Web App (for getting credentials)**

1. Go to **Project Overview > Web** icon (</>) to register an app.
2. Give your app a nickname like SmartAgriWebClient.
3. Firebase will now show your **API config object** – copy this and save it. Example:
4. const firebaseConfig = {
5. apiKey: "your-api-key",
6. authDomain: "your-app.firebaseapp.com",
7. databaseURL: "https://your-app.firebaseio.com",
8. projectId: "your-app",
9. storageBucket: "your-app.appspot.com",
10. messagingSenderId: "123456789",
11. appId: "1:123456789:web:abcd1234"
12. };

**Step 4: Update Security Rules**

To allow only read/write access from authenticated or authorized sources like your ESP32 (using secrets or REST API), update rules in the **Realtime Database > Rules** tab:

{

"rules": {

".read": true,

".write": true

}

}

**Note:** The above is insecure. For production, use more secure rules like:

{

"rules": {

"sensors": {

".read": "auth != null",

".write": "auth != null"

}

}

}

🔐 You can get your **database secret** from:  
**Firebase > Project Settings > Service Accounts > Database secrets**