Concept to Design a Hand-Held Crop Management Device (CMD) for Farmers

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ABSTRACT
Crop Management Device (CMD) is a hand-held device capable of providing guidance to farmers with respect to irrigation, fertilization, scheduling of crop management and pest control. CMD incorporates modifications/ additions in a low cost mobile phone converting it into a dedicated agriculture support solution. The device takes as input, data regarding the type of soil, annual rainfall, atmospheric humidity, temperature, wind velocity, and daylight period from the Internet. User provides information regarding agricultural techniques practiced directly by him. Soil temperature sensor, pH sensor, and soil water content sensors would be provided in the CMD. The device is appended with a rule based decision making algorithm which would generate statements suggesting measures for improved crop management.

INPUTS TO THE DEVICE
- **USER INPUT INTERFACE**
  - Enter crop name
  - Enter crop schedule
  - Enter farm area

INFORMATION RETRIEVAL FROM THE INTERNET
- Weather information on rainfall, wind velocity and daylight
- Geographical information on soil type
- Data gets automatically collected based on Latitude-Longitude of particular location
- Numerically converted data used in final computations

FLOWS DESIGN OF COMPUTATION PROCEDURE

- **CMD INPUT DATA COLLECTION**
  - User inputs
  - Internet data
  - Sensor Probe data (digitized)

  - Soil Type 1
  - Soil Type 2
  - Soil Type 3
  - Soil Type n

  - Crop Type 1
  - Crop Type 2
  - Crop Type 3
  - Crop Type n

WEIGHT BASED CALCULATIONS ON THE INPUT PARAMETERS
- Area of farm
- Soil crusting
- Nitrogen content
- Crop specific parameter weight selection

DIGITALIZED INPUTS FROM SENSORS
- Soil moisture content sensor
- Soil temperature sensor
- pH sensor
- Soil moisture content sensor

OUTPUTS FROM THE CMD
- **USER OUTPUT INTERFACE**
  - Results for Crop:
    - Crop specific benefits
    - Suggested action
    - Guidance and assistance

  - Irrigation index (II): based events
    - Suitable irrigation plan
    - Current water needs
    - Nearby support helpline details

  - Fertilization index (FI): based events
    - Suitable fertilization advice
    - Usage procedure specifications
    - Nearby support helpline details

  - Schedule guidance
    - Schedule from current stage
    - Deficit stages
    - Mark on calendar

  - Pesticide usage guidance
    - Nearly available pesticide list
    - Usage instructions
    - Helpline contact details