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Implementation of Smart Village with Sustainable Development

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Abstract : The thought of a Sustainable Village is brought up by development in the geographic region that has solutions to issues that occurred and improves the standard of life. In most rural areas, the issues found - low economic condition, smart quality education, water management system, waste management system, and restricted access to technology, due to this there's a lack of awareness regarding schemes and subsidies in varied areas provided by the government. The project work is applied to implement a sustainable village model that's capable to be a model for every village to develop towards a higher future. In major agricultural countries, the main part of the offered land is roofed by the agricultural areas; but, they typically stay outside the thought of innovative development processes. Still, rural areas have potential and are very important for implementing the extremely valid thought of persistent and sustainable development. The main aim of this project is to gift the sustainable village system thought as a way sensing weather parameters, soil moisture detector, LDR primarily based street light and every one of the parameters square measure uploaded to cloud platform, farmers will monitor remotely and a few schemes and subsidies in varied areas provided by the government, also are displayed and it may be conveyed to farmers through peer entity as they lack education. The sustainable village thought may help facilitate the sustainable development of rural areas.

Keywords: Rural area; Sustainable development; smart village.

1. Introduction

Sustainable development suggests making the world a better place for everybody to live now, while not destroying the chances for a consecutive generation. The three things for sustainable development thought to be illustrious are social progress, economic development, and climate and surroundings. India is the country's agricultural for its outstanding agricultural lands and its alternative resources. Farming is the backbone of the advancement of the nation. The data on state policies for villagers is known that is provided by the state and central government. In recent days, the temperature and soil moisture factors have affected the growth of agriculture like productivity, diseases, and yield production. Agriculture-based problems have been the barrier to the development of the nation. There is a requirement for the Modernization of these current standard techniques for agriculture. New trends in Agriculture are needed in managing crops in controlled surroundings. The revolution in India was started in the year 1960 to alleviate hunger and economic condition by introducing high-yielding kinds of rice and wheat, however, the assembly

of alternative food crops like millets, and indigenous rice declined. This led to the loss of the distinct indigenous crops from cultivation and conjointly crops. It deals with the impacts the green revolution had on the assembly of indigenous crops, its effects on society, surroundings, etc which cannot be considered sustainable development. The faster growth of the crops due to the genetically modified may negatively impact the agricultural ecosystem. So, in this paper, we have taken one step ahead and tried to make the crops grow healthier without any negative impact on agriculture and also educate farmers regarding a sustainable environment which results in the sustainable development of the system.

2. Literature Survey

Sustainable development suggests making the world a better place for everybody to live now, while not destroying the chances for a consecutive generation. The three things for sustainable development thought to be illustrious are social progress, economic development, and climate and surroundings. India is the country's agricultural for its outstanding agricultural lands and its alternative resources. Farming is the backbone of the advancement of the nation. The data on state policies for villagers is known that is provided by the state and central government. In recent days, the temperature and soil moisture factors have affected the growth of agriculture like productivity, diseases, and yield production. Agriculture-based problems have been the barrier to the development of the nation. There is a requirement for the Modernization of these current standard techniques for agriculture. New trends in Agriculture are needed in managing crops in controlled surroundings. The revolution in India was started in the year 1960 to alleviate hunger and economic condition by introducing high-yielding kinds of rice and wheat, however, the assembly of alternative food crops like millets, and indigenous rice declined. This led to the loss of the distinct indigenous crops from cultivation and conjointly crops. It deals with the impacts the green revolution had on the assembly of indigenous crops, its effects on society, surroundings, etc which cannot be considered sustainable development. The faster growth of the crops due to the genetically modified may negatively impact the agricultural ecosystem. So, in this paper, we have taken one step ahead and tried to make the crops grow healthier without any negative impact on agriculture and also educate farmers regarding a sustainable environment which results in the sustainable development of the system.

What is Sustainable development?

Meeting human development goals while also sustaining the ability of natural systems to provide the natural resources and ecosystem services on which the future and society are highly dependent.

Examples :

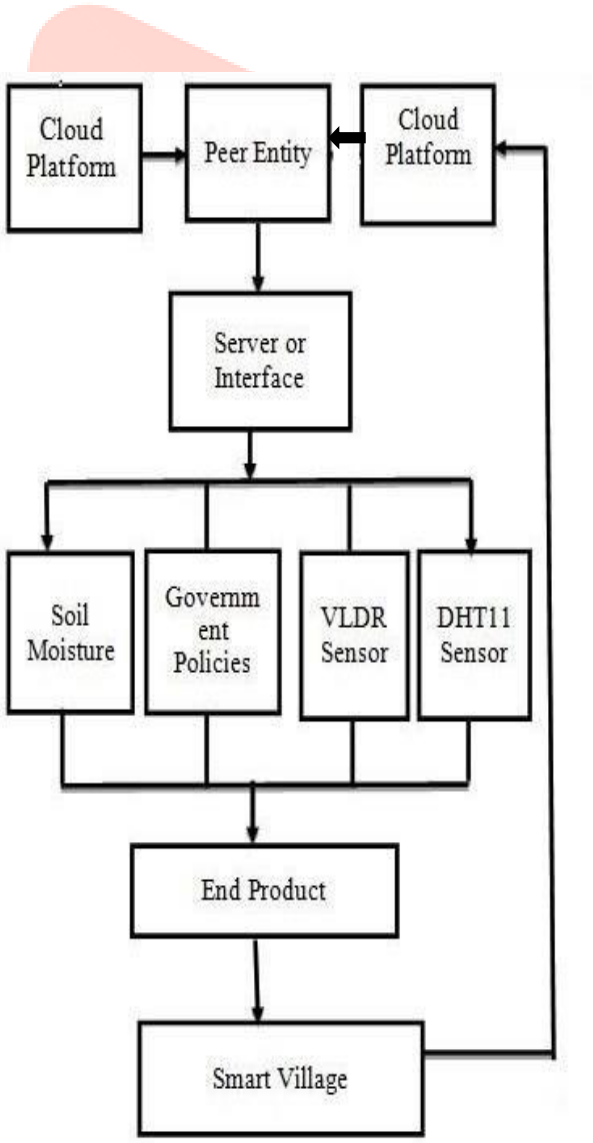
Rainwater Harvesting- As villages receive heavy rain the water can be stored in underground tanks.

Biogas Plant - Rural areas have many cattle which produce the dung which can be used to implement this system

Crop rotation and similar agricultural methods.

The above methods are educated to the Village people and adaptation of the same for Sustainable development

3. Proposed Methodology



The above block diagram is the overall representation of the whole system which includes the information regarding the moisture content of the soil and the weather report at that place and also gives information regarding the government policies of state and central government to the people of the village. All this information is displayed on LCD at the village panchayat where a peer person will read it and gives the information to the people of the village. Some sustainable ideas like rainwater harvesting and biogas implementation are being educated to farmers and adopted. This complete information regarding the sensors and the government policies without harming the environment will be saying it a Smart Village with sustainable development.

Hardware Requirements:

- **LDR Sensor** - A light-dependent resistor also called a photo-resistor is a variable resistor whose value decreases with increasing incident light intensity. When the light intensity inside a room is less, it will help switch on the LEDs or lights.
- **Soil Moisture Sensor**- A Sensor which used to sense the moisture content of the soil. It contains a fork-shaped probe with two exposed conductors that goes into the soil or anywhere else where the water content is to be measured. The soil moisture sensor is super easy to use and only has 4 pins to connect.
- **Temperature and Humidity Sensor-** DHT11 Humidity Sensor consists of 4 pins: VCC, Data Out, Not Connected (NC), and GND. The range of voltage for the VCC pin is 3.5V to 5.5V. It is used to check the surrounding temperature and humidity.

  AO (Analog Output) pin gives us an analog signal between the supply value to 0V and will be connected to one of the analog inputs on your Arduino.

  DO (Digital Output) pin gives Digital output of internal comparator circuit. You can connect it to any digital pin on an Arduino or directly to a 5V relay or similar device.

  VCC pin supplies power for the sensor. It is recommended to power the sensor with between 3.3V – 5V. Please note that the analog output will vary depending on what voltage is provided for the sensor.

  GND is a ground connection.

Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It's 14 digital input/output pins (of that 6 are often used as PWM outputs), 6 analog inputs, a 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything required to support the microcontroller; merely connect it to a laptop with a USB cable or power it with an AC-to-DC adapter or battery to get started.

2 X 16 LCD Display: A liquid crystal display (LCD) has material that joins along with the properties of each liquid and crystal. They need a temperature range within which the particles are basically as mobile as they might be in a liquid, however, are gathered along to form like a crystal. The LCD is a much more informative output device than a single LED. The LCD is a display that will simply show characters on its screen. They need some lines for large displays. Some LCDs are specially designed for specific applications to display graphic pictures. 16×2 LCD (HD44780) module is often used. These modules are replaceable of 7-segments and alternative multi-segment LEDs. LCD can be easily interfaced with a microcontroller to display a message or the status of the device. It can be operated in 2 modes: 4-bit mode and 8-bit mode. This digital display has 2 registers specifically the command register and data register. It's having 3 selection lines and eight data lines. By connecting the 3 selection lines and data lines with the microcontroller, the messages can be displayed on LCD.

Software Requirements:

Blynk

Blynk is designed for the Internet of Things. It can control hardware remotely, it can display sensor data, can store data, visualize it, and do many other cool things. There are three major components in the platform: Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide. Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices, and can even be launched on a Raspberry Pi. Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.

Working of hardware and cloud systeml:

The microcontroller is the heart of the proposed system. All the sensors are connected to the microcontroller. The information regarding the environmental condition and other state and central government policies which are

useful to farmers are collected into the cloud platform which will access the data and will store it with the help of a program over the internet. The soil moisture sensor, DHT11 sensor, and LDR sensor are connected to the node Microcontroller unit (Arduino MCU Atmega328P). When the suitable voltage from the system is given to the Arduino MCU Atmega328P module, the device activates and that makes all the 3 sensors turn ON. Through the Arduino IDE platform, the code is uploaded to the Arduino MCU Atmega328P.

The Soil moisture sensor detects the moisture content of the soil which is in the analog signal. The temperature and humidity sensor (DHT11) detects the surrounding temperature and humidity. 5V supply is recommended, although the supply voltage ranges from 3.3V to 5.5V. In the case of a 5V power supply, you can keep the sensor as long as 20 meters. However, with a 3.3V supply voltage, cable length shall not be greater than 1 meter. Otherwise, the line voltage drop will lead to errors in measurement and the LDR sensor controls the street light according to daylight.

All these signals are sent to the Arduino MCU Atmega328P module and this module detects the signal through Wi-Fi availability, it sends information to the BLYNK cloud. So that users can access and monitor the information through LCD which helps to show all the information regarding agricultural development which comes under government policies. With this farmers will easily come to know about the climatic conditions, soil information, and government policies. So that we can easily implement this method and help farmers to yield good crops which leads to a smart village with sustainable development.

The complete code for this project is written in Embedded C language and in the code, we have included the library of the DTH11 sensor and included the library of Arduino MCU from Arduino IDE. When the Wi-fi module sends the information to the cloud then in Arduino IDE we can view it through the serial monitor of COM3 of serial communication and this data can also be viewed on the Blynk website just by logging in it and thereby the information is displayed it through LCD.

Access of information through Blynk:

Blynk works over the Internet. This means that the hardware you choose should be able to connect to the internet. Some of the boards, like Arduino Uno, will need an Ethernet or Wi-Fi Shield to communicate, others are already Internet-enabled: like the ESP8266, and Raspberri Pi with WiFi dongle. We can connect it over USB to your laptop or desktop. Besides this farmers are also educated about sustainable methods.

4.Advantages & Disadvantages

1. This will make the people visit the office to enquire about the particular services frequently. They come to know the availability of services when and can be directly intimated through the LCD placed in the Panchayat.

2. It will benefit the people living in remote areas and will keep them updated on the schemes provided by the government for their better living conditions.

3. This system will keep the rural people updated on the government schemes and facilities.

Disadvantages:
1. Initial cost is high

5. Application

This Project itself is an application as we are proposing a model which is ideal and suistainable so it can be implemented in the Rural areas.

6.Conclusion

A thorough literature survey is done concerning the implementation of smart villages. Based on this literature survey the problem is defined for the implementation of the smart village along with objectives. In this course, work is carried out to frame a block diagram. The specifications of Hardware and Software components required for implementation are specified. A model of a smart village is designed concerning all required specifications mentioned above to finally accomplish the work towards implementation of the smart village with sustainable development.

This proposed model is expected to be a reference for developing a village that is certainly adapted to the needs of the rural area.

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4. References

[1] "The Smart Village Model for Rural Area. IOP Conference Series: Materials Science and Engineering.
(Case Study: Banyuwangi Regency) in 2017.

[2] Hani Eskandar, Niger's Smart Villages Project.
ICT Applications Coordinator for ITU's Telecommunication Development Bureau in 2019.

[3] Gayathri Natarajan, D.L. Ashok Kumar, "Implementation of IoT Based Smart Village for the Rural Development." International Journal of Mechanical Engineering and Technology (IJMET), in 2017.

[4] Haslenda Hashim, Wai Shin Ho, JengShiun Lim, Sandro Macchiato,. Townships for Sustainable Cities 2012 Drivers of National Competitiveness, National Competitiveness council report, National Competitiveness council. International journal of research in engineering science & technology in 2013.

[5] Morgan Chamberlin, "The Environmental impact of genetically modified crops", Montana state University.