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Project Report

Sub-Theme: Technological Innovation for Ecosystem and Health

Project Title:

IOT Based Fertilizer System

NAMEOF CHILD SCIENTIST: *GUIDED BY:*

SOUMYA RANJAN SAHOO (GROUP LEADER) *TANMAY KUMAR NAYAK*

ABHINAV PANDA (CO-WORKER)

INSTITUTION ADDRESS

D.A.V. PUBLIC SCHOOL UNIT-8

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Author's Name: Soumya Ranjan Sahoo (Team Leader), Abhinav Panda

Name of School: D.A.V. Public School Unit-8

Address of School: Unit-VIII P.O.- Nayapalli, Bhubaneswar, Odisha 751012

District: Khordha State: Odisha PIN:751012

IoT Based Fertiliser System

Agriculture is an important sector of Indian economy as it contributes about 17% to the total GDP and provides employment to over 60% of the population. Moreover, in a country like India, where a large part of the 1.39 Billion population depends upon agriculture, undoubtedly agriculture is one the most important sectors of India. The more we develop agriculture, the more we develop our country. As we are advancing towards the future, techno is helping us to do our work in an easier and efficient way. So, our project's main motive is to develop the agricultural field of our country through the current technology that we have with us at a very very low price. The project works on the principles of **Fertigation** (It is a method of fertilizer application in which fertilizer is incorporated within the irrigation water by the drip system) and **IoT** (Internet of Things- One of the most dynamic and exciting developments in information and communications technology is the advent of the Internet Of Things(IoT) . In this project, there are containers in which desirable fertilisers, pesticides, etc. can be stored which are connected to the main water tank where they can be mixed according to the proportion decided by the user. From this water tank, the fertilizers can be supplied to the fields in the same way. This total process can be carried out through our smart phones even without internet from a large distance. This helps the farmer get better production at a low cost. Even more than 3 fertilizers can be stored, so even if it is not affordable to farmers, they can contribute and together buy this system and can get benefitted together. In India, unfortunately many farmers belong to the small and medium scale farmer group. My project is made in a cost-effective method. This project costed only 800/- and its cost would be less in real life as it would be produced in bulk. Thus, it can be availed by all scales of farmers. This can help advance the agricultural sector in a cost-effective way.

Name & Address of Guide Teacher: Tanmay Kumar Nayak : Unit-VIII P.O.- Nayapalli, Bhubaneswar, Odisha 751012

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REVIEW OF LITERATURE

Agriculture is an important sector of Indian economy as it contributes about 17% to the total GDP and provides employment to over 60% of the population.

Indian agriculture has registered impressive growth over last few decades. Agriculture plays a chiefly role in economy as well as it is considered to be the backbone of economic system for developing countries. For decades, agriculture has been related with the production of vital food crops.

The Present era of farming contains dairy, fruit, forestry, poultry beekeeping and arbitrary etc. However, it could be referred to as promotion, processing, marketing, and distribution of crops and **livestock** products.

It also provides the employment chances to huge percentage of the inhabitants. The incoming sources of many peoples depends on the agriculture, about 70% population of directly rely with agriculture for livelihood. This gigantic ratio in this sector is as a result of none development of non-agricultural activities to absorb the fast-growing population. To enrich the economy through the introduction of farm mechanization played effective role in agriculture sector.

With the use of modern machinery in agricultural lands causes more and high-quality production of crops. So, the provision of raw material to the industries increases.

Fertilisers play an important role in the field of agriculture.To grow healthy crops full of nutrients, farmers need to ensure they have healthy soil. Without fertilizers, nature struggles to replenish the nutrients in the soil.

When crops are harvested, important nutrients are removed from the soil, because they follow the crop and end up at the dinner table. If the soil is not replenished with nutrients through fertilizing, crop yields will deteriorate over time.

Careful analysing and fertilizing of crops enable a chain that provides humans with nutritional food:

- The nutrients feed the soil
- The soil feeds the plants
- Plants feed animals and people

The three most common mineral fertilizers are those based on nitrogen, phosphorus and potassium.

The International Fertilizer Association (IFA) estimate that 85% of the soils globally are deficient in nitrogen[(1)]. 73% of the soils are deficient in phosphorus, whereas 55% lack potassium.

Take nitrogen for example: Since plants are not capable of absorbing it from the air directly, the soil is their only means of acquiring this important nutrient. If the soil is low on nitrogen, fertilizers are needed to boost nutritional levels.

Large concentrations of potassium sources occur deep below the soil surface (often around one kilometre) and are far beyond the reach of plant roots. Mining of potassium brings this naturally occurring nutrient to the soil surface and within the grasp of plant roots.

Phosphorus exists in certain rocks, but for plants to access this nutrient, it needs to be water soluble. The correct use of phosphorus fertilizers helps plants absorb it through the soil and ensures a high production and rapid growth.

ANALYSIS OF PROBLEMS

Irrigating the field and spraying of fertilisers, pesticides and insecticides in the field are vital in having a good yield per hectare and get better quality produce. But Indian farmers face many difficulties while irrigating their fields. So, use of modern machinery can help farmers ease their hardships. But Indian farmers are mainly small farmers who don't have enough capital to afford these machineries. Moreover, till date there isn't any machinery or system which

could help them solve almost all of their problems. Our package can help the farmers use the modern technology at a cost-effective price.

Manually spraying of fertilisers in the fields by the farmers include many hardships such as the various types of challenging climatic conditions, infections due to contact with skin, ears, eyes, nose etc. These problems can be tackled through the help of our innovation.

Medical problems aren't something whose arrivals are known to us. Farmers are also humans, so they also suffer from diseases. During these times of medical problems, when the farmer himself or his family member is admitted to the medical and other members stay busy taking care of the ill member. So, there is no one left to do the hectic work of irrigating large fields and supplying fertilisers, pesticides or insecticides to the fields, in short, to take care of the fields. In such cases our package can provide them an all in one solution for their problems. They can know the health of their field and supply water, fertilisers, insecticides or pesticides according to the requirement from any distance with the help of their mobile phone.

In India, farmers usually don't have land at a fixed location which means they own land at different locations which maybe even very far from each other. In such cases farmers find it difficult to maintain their fields and get data about their condition at regular intervals. They also face problems while irrigating these fields and providing them with fertilisers and other essential stuff which as a result decreases the overall produce.

To face all this kind of problems faced while taking care of the field, we need an all in one solution which can provide us the data of our fields and also help in managing them even from a remote location.

HYPOTHESIS

Fertilisers play an important role in the field of agriculture.To grow healthy crops full of nutrients, farmers need to ensure they have healthy soil. Without fertilizers, nature struggles to replenish the nutrients in the soil.

What will a farmer do when he is sick and there is no one to manage his fields? What will a farmer do when he is unable to maintain his fields properly due to the large distance between his fields? Will he just leave his fields at their condition and suffer the great loss both economically and mentally?

A national cross- sectional study in Lebanon reveals novel findings in terms of the willingness of 90% of the farmers to manage their farm water applications and adopt smart irrigation technologies that will help them do get better production. The same goes with the process of application of fertilisers. The use of modern technologies in maintaining the fields can help take accurate care of our fields which in result will help the farmers get better yield.

So, our project **"IoT Based Fertiliser System"**can help the farmers tackle all these problems at a low price. It can help the farmers control and manage their fields even when they are at a long distance from their cultivated land. It can also prevent the loss of fertilizers. Thus, our project which is based on various real-life surveys and experimentations can provide a complete package for their agricultural practices.

OBJECTIVES

Our objectives of the project are as follows:

1) To ease all the hardships of the farmers while irrigating the fields and providing the fields with different kind of fertilisers, pesticides or insecticides.

2) To help the government to have better and systematic control over the distribution of fertilisers.
3) To provide modern technology to Indian farmers at an affordable price in the field of agriculture.
4) To help farmers get better produce by supplying accurate amount of fertilisers, insecticides or pesticides in the fields.

METHODOLOGY

The methodology in this project contains various parts which can be divided into mainly two categories- a) Experimentation and b) Survey.

a) Experimentation

The materials used in this project: -

- Node MCU
- Pipes
- Water Motors
- Connecting wires
- Temperature Sensors
- Containers (To represent tanks)
- Relay
- Moisture Sensors

- In this project we used 3 containers to represent the tanks where the required fertilisers/insecticides/pesticides etc. can be stored. However, more no. of tanks can be constructed and used as per the requirement of the owner or as per the requirement of the group of farmers owning this.

- Next, we have used another separate container which stays near the field containing water. This can also bereferred to as the 'main tank'.

- The motors which are equivalent to the number of containers used are installed in the tanks which then are connected to the main water tank with the help of underground pipes.

- Required number of pipes are taken and connected underground to the main water tank so that they do not create any problem in usual public work.

- Then we constructed the main circuit which helps us connect our device to this system contains a Node MCU which connects us to our device through internet from any distance with ease.

- The circuit also contains a moisture sensor and temperature sensor which helps us to know about the field health and know the temperature of the place so that water or fertilisers can be supplied according to the need.

- Then the app is connected to the Node MCU from where we can control the system and manage our fields.

- The working of this project is as follows: -
  The motors installed are switched on through our device as per the timing (we can also set a timer according to which the field would be irrigated or be provided with fertilisers). Switching on the motors allows the desired fertilisers to mix with the main water tank according to the proportion decided by the user from which they can be supplied to the fields. The moisture and temperature sensors help us to know the field health. All these information and functions can be availed through our devices with the help of internet from any distance.

  ***Note**- If the farmer wants he/she can only provide the field with water instead of adding fertilisers or any such substance to it.

b) Survey

Our project also consists the method of survey which helped us to know the exact problems and difficulties faced by the farmers during the irrigation of fields and also while providing insecticides. We surveyed 50 farmers of our localities and enquired about the problems regarding application of irrigation and fertilizers in their fields. We also collected data from agricultural experts and interacted with professors of OUAT (Odisha University of Agriculture and Technology) on this topic. We found that most farmers agreed that use of modern technologies in agriculture can help them getting better yield and facilities. But the reason behind their hesitation to use the modern technology was the high expensive nature of these machines. Moreover, they also stated that there were no such machineries which could solve their problems completely. Several farmers also expressed their discontentment to the problems faced by them while irrigating the field and while providing fertilisers, pesticides or insecticides to the crops in their fields.

DATA ANALYSIS

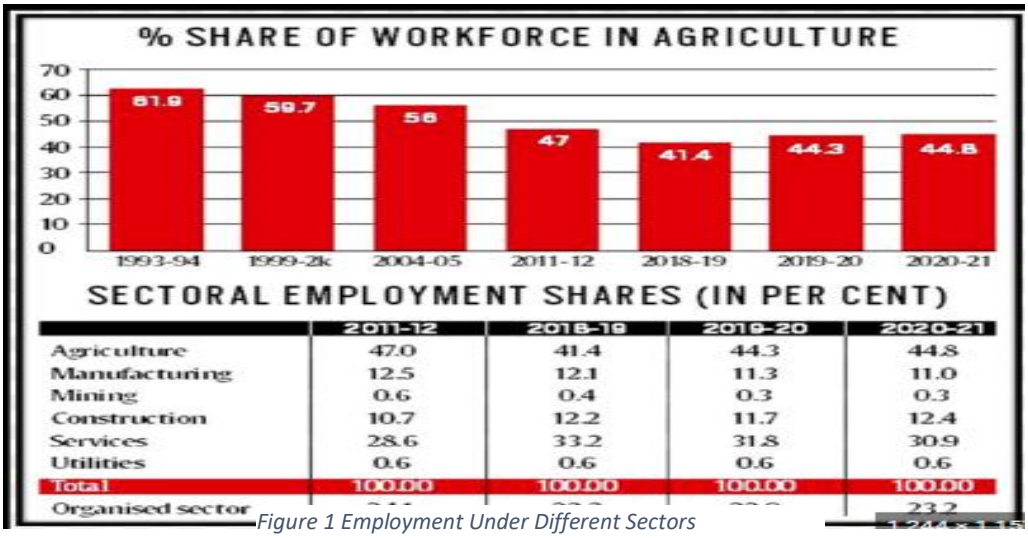

Figure 1 Employment Under Different Sectors

S. No. (1)	State/Zone (2)	2018-19 N (3)	2018-19 P (4)	2018-19 K (5)	2018-19 Total (6)	2019-20 N (7)	2019-20 P (8)	2019-20 K (9)	2019-20 Total (10)	2020-21 N (11)	2020-21 P (12)	2020-21 K (13)	2020-21 Total (14)
South Zone													
1	Andhra Pradesh	929.35	429.29	200.44	1559.08	980.95	490.29	211.79	1683.03	1139.63	618.59	267.72	2025.94
2	Telangana	887.27	333.86	102.46	1323.59	987.09	369.68	122.41	1479.18	1169.73	474.60	173.22	1817.55
3	Karnataka	945.27	504.14	284.77	1734.18	1017.59	560.33	282.99	1860.91	1179.45	688.20	355.19	2222.84
4	Kerala	68.66	32.87	56.81	158.34	79.27	33.77	61.83	174.87	88.06	37.96	75.09	201.11
5	Tamil Nadu	566.96	218.13	175.54	960.63	582.30	233.56	171.31	987.17	644.86	269.32	206.72	1120.90
6	Puducherry	7.03	1.23	1.08	9.34	6.78	1.83	0.91	9.52	8.48	2.16	1.55	12.19
7	A&N Islands 8	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.13	0.00	0.00	0.13
	Lakshadweep	**3404.54**	**1519.52**	**821.10**	**5745.16**	**3653.98**	**1689.46**	**851.24**	**6194.68**	0.00	0.00	0.00	0.00
	SZ TOTAL West	1103.74	326.98	116.20	1546.92	1296.44	381.65	113.58	1791.67	4230.34	2090.83	1079.49	7400.66
Zone		1637.99	868.73	114.42	2621.14	1673.06	894.31	116.02	2683.39	1349.67	470.81	136.93	1957.41
9	Gujarat	453.35	212.27	57.13	722.75	449.68	225.53	62.14	737.35	1732.70	1020.62	140.19	2893.51
10	Madhya Pradesh	1443.48	836.95	508.25	2788.68	1560.96	898.21	482.12	2941.29	525.09	271.99	74.53	871.61
11	Chhattisgarh	1096.80	401.86	25.94	1524.60	1217.55	479.06	20.97	1717.58	1699.85	1127.93	585.82	3413.60
12	Maharashtra	1.72	1.35	0.95	4.02	1.34	0.87	1.01	3.22	1242.56	509.77	24.66	1776.99
13	Rajasthan	0.00 0.12	0.00 0.07	0.00 0.00	0.00 0.19	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	1.77	0.93	0.96	3.66
14	Goa	**5737.20**	**2648.21**	**822.89**	**9208.30**	**6199.03**	**2879.63**	**795.84**	**9874.50**	0.00 0.52	0.00 0.36	0.00 0.00	0.00 0.88
15	Daman &Diu 16									**6552.16**	**3402.41**	**963.09**	**10917.66**
	D&N Haveli **WZ TOTAL**	1100.09	290.29	47.66	1438.04	1069.64	302.93	37.88	1410.45				
North Zone		1475.52	354.81	45.61	1875.94	1499.79	363.06	43.03	1905.88	1107.03	318.45	39.19	1464.67
17	Haryana	3292.00	1010.84	173.24	4476.08	3740.23	1226.82	205.92	5172.97	1495.18	382.65	55.42	1933.25
18	Punjab	134.62	23.16	7.67	165.45	123.87	30.73	8.81	163.41	3963.73	1426.83	238.43	5628.99
19	Uttar Pradesh	37.38	9.74	9.16	56.28	38.29	10.38	9.95	58.62	120.68	28.99	8.37	158.04
20	Uttarakhand	69.80	22.87	15.80	108.47	50.82	16.83	11.19	78.84	37.75	11.25	10.26	59.26
21	Himachal Pradesh	9.93	1.30	0.33	11.56	12.27	2.05	0.32	14.64	114.10	37.56	28.84	180.50
22	J & K	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.71	1.70	0.29	12.70
23	Delhi 24 Chandigarh **NZ**	**6119.34**	**1713.01**	**299.47**	**8131.82**	**6534.91**	**1952.80**	**317.10**	**8804.81**	0.00	0.00	0.00	0.00
TOTAL										**6849.18**	**2207.43**	**380.80**	**9437.41**
East Zone		1190.32	350.21	135.81	1676.34	1235.32	423.35	161.83	1820.50				
25	Bihar	127.09	39.18	4.97	171.24	131.90	45.18	4.59	181.67	1285.28	457.97	167.71	1910.96
26	Jharkhand	309.25	132.00	66.73	507.98	348.21	151.22	74.95	574.38	144.19	58.24	5.72	208.15
27	Orissa 28 West Bengal	768.89	400.72	324.70	1494.31	790.07	460.47	348.62	1599.16	347.24	178.88	85.07	611.19
EZ TOTAL		**2395.55**	**922.11**	**532.21**	**3849.87**	**2505.50**	**1080.22**	**589.99**	**4175.71**	800.67	518.55	418.39	1737.61
North East Zone		215.29	48.83	52.15	316.27	181.74	50.12	46.47	278.33	**2577.38**	**1213.64**	**676.89**	**4467.91**
29	Assam 30	12.30	4.42	1.43	18.15	8.73	5.62	5.28	19.63	175.63	54.76	49.23	279.62
Tripura		11.18	0.45	0.10	11.73	12.82	3.70	0.98	17.50	7.27	6.18	2.59	16.04
31	Manipur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.73	2.54	1.61	14.88
32	Meghalaya	0.22	0.01	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.04	0.00	0.34
34	Arunachal Pradesh	6.09	0.09	0.01	6.19	3.78	0.21	0.09	4.08	0.00	0.00	0.00	0.00
35	Mizoram 36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.13	0.00	1.12
	Sikkim **NE TOTAL**	**245.08**	**53.80**	**53.69**	**352.57**	**207.07**	**59.65**	**52.82**	**319.54**	0.00	0.00	0.00	0.00
	ALL INDIA	**17901.71**	**6856.65**	**2529.36**	**27287.72**	**19100.49**	**7661.76**	**2606.99**	**29369.24**	**194.92**	**63.65**	**53.43**	**312.00**
										20403.98	**8977.96**	**3153.7**	**32535.64**

Table-1 State wise consumption of Fertilizers in terms of Nutrients (NPK)(In Thousand Tonnes); Source- FMS, Department Of Fertilizers.

	N	P	K	TOTAL	N	P	K	TOTAL	N	P	K	TOTAL	Imported Urea (` Crore)
2000-01	109.20	42.15	15.68	167.02	109.61	37.43	0.00	147.04	1.54	3.96	15.41	20.91	*
2001-02	113.10	43.82	16.67	173.60	107.71	38.61	0.00	146.32	2.69	4.29	17.01	23.99	113.09
2002-03	104.74	40.19	16.01	160.94	105.62	39.06	0.00	144.68	0.67	1.70	15.20	17.57	*
2003-04	110.77	41.24	15.98	167.99	106.34	36.32	0.00	142.66	1.32	3.38	15.48	20.18	*
2004-05	117.14	46.24	20.61	183.98	113.39	40.65	0.00	154.04	4.11	2.96	20.45	27.52	684.73
2005-06	127.23	52.04	24.14	203.41	113.55	42.21	0.00	155.76	13.85	11.21	27.47	52.53	1747.34
2006-07	137.73	55.43	23.35	216.51	115.77	45.17	0.00	160.94	26.88	13.23	20.69	60.80	4647.18
2007-08	144.19	55.15	26.36	225.70	108.99	38.07	0.00	147.06	36.77	12.53	26.53	75.83	8334.65
2008-09	150.91	65.06	33.13	249.09	108.70	34.64	0.00	143.34	38.44	29.27	33.80	101.51	11091.87
2009-10	155.80	72.74	36.32	264.86	119.00	43.21	0.00	162.21	34.47	27.56	29.44	91.47	5754.01
2010-11	165.58	80.50	35.14	281.22	121.57	42.23	0.00	163.80	44.92	38.02	40.69	123.63	8348.89
2011-12	173.00	79.14	25.75	277.90	122.59	43.68	0.00	166.27	52.40	44.27	33.35	130.02	15442.02
2012-13	168.21	66.53	20.62	255.36	121.94	38.30	0.00	160.24	46.90	27.78	12.30	86.98	15980.22
2013-14	167.50	56.33	20.99	244.82	123.78	39.60	0.00	163.38	38.08	15.90	13.33	67.31	14987.95
2014-15	169.45	60.98	25.32	255.76	123.94	41.21	0.00	165.15	47.66	18.32	25.37	91.35	12035.26
2015-16	173.72	69.79	24.02	267.53	134.14	43.94	0.00	178.08	50.68	28.88	20.53	100.09	13984.93
2016-17	167.35	67.05	25.08	259.49	133.51	45.95	0.00	179.46	33.85	21.30	23.25	78.40	7024.32
2017-18	169.58	68.54	27.79	265.91	133.83	47.23	0.00	181.06	35.88	20.47	28.95	85.30	8350.94
2018-19	179.02	68.57	25.29	272.88	132.98	45.94	0.00	178.92	47.01	31.67	26.29	104.97	-
2019-20	191.00	76.62	26.07	293.69	136.85	47.91	0.00	184.76	51.91	24.13	22.8	98.84	
2020-21	204.04	89.78	31.54	325.36	137.15	47.39	0.00	184.54	56.33	25.43	26.7	108.46	-

Year	Consumption	Production	Import	(Lakh) C &F Value

*Table-2 Consumption, Production and Import of Fertilizers(Lakh Tonnes); Source: Department of Fertilizers and Department of Agriculture & Farmers Welfare **

Serial No.	Crop	Saving in fertilizer, %	Increase in Yield, %
1	Okra	40	18
2	Onion	40	16
3	Broccoli	40	10
4	Banana	20	11
5	Castor	60	32
6	Cotton	30	20
7	Potato	40	30
8	Tomato	40	33
9	Sugarcane	50	40

Table-3 Savings in fertilizer and increase in crop yield under fertigation as compared to conventional method of fertilizer application

	Temperature range (°C)		
Fertilizer	Cold	Luke warm	Hot
Ammonium Chloride	297 (0°c)	-	7580 (100°c)
Ammonium Nitrate	1183 (0°c)	1950 (20°c)	3440(50°c)
Mono Ammonium Phosphate (MAP)	227 (0°c)	282 (20°c)	417 (50°c)
Di Ammonium Phosphate (DAP)	429 (0°c)	575 (10°c)	1060 (70°c)
Ammonium Sulphate	706 (0°c)	706 (20°c)	850 (50°c)
Muriate of Potash	280 (0°c)	347 (20°c)	430 (50°c)
Potassium Nitrate	133 (0°c)	316 (20°c)	860 (50°c)
Potassium Sulphate	69 (0°c)	110 (20°c)	170 (50°c)
Calcium Nitrate	1020 (0°c)	3410 (50°c)	3760 (99°c)
Phosphoric acid	-	5480 (25°c)	-
Urea	780 (5°c)	1193 (25°c)	-

Table-4 Solubility of Fertilizers in Different Temperatures

RESULTS

1. Figure-1- This pie-chart clearly shows us that agriculture provides the most employment as compared to other sectors. Thus, it plays a significant role in

building the economy of India. So, developing this sector will help us develop our country economical condition.

2. Table-1- This table presents to us the state-wise consumption of fertilizers in terms of nutrients. We can clearly understand fertilizers areused in large quantities to increase the yield. Thus, they play an important role in increasing the yield and also increasing the quality of the produce.

3. Table-2- This table showing the consumption, production and import of fertilizers show that a large amount of fertilizers is imported from foreign. The government of our country and states spend crores of money for providing subsidies. These facts aware us about the need of using the fertilizers precisely. So, the large amounts of money do not get wasted.

4. Table-3-This important table shows the advantages of using fertigation. It not only prevents the wastage of fertilizers but this method also provides proper amount of fertilizers at the root zone which helps in increasing the yield and getting a better-quality produce.

5. During our survey, we also came to a conclusion that farmers face a lot of difficulties while irrigating their fields or fertilizing their fields.

6. Table-4- The table representing the solubility of different commonly used fertilizers can help the farmers use the fertilizers properly during the process of fertigation. So, the farmers can mix the fertilizers properly and supply it in a better proportion which can help in yielding a better produce.

CONCLUSION

Our project named “IoT Based Fertilizer System” can help the farmers get their problems faced during managing their fields solved at a low price and also avail the modern technology. It will enable them to manage their fields from any distance with ease with the help of their mobile phones.

As the reports state, agriculture plays a major role in building the economy of our country. So, it is undoubtedly one of the most important sectors of India. Thus, to develop our country we need to develop the agriculture sector.

Most farmers agree that use of modern technology can help them get better results in their produce and also help them solve the problems that they face during farming. But they hesitate to use the modern-day technology due to its expensive nature and moreover, till date no machinery could provide a complete solution to the problems faced by the farmers while maintaining their fields.

As we saw above, government spends a lot of money on providing subsidies to farmers on fertilizers. But using other different methods of irrigation wastes a lot of fertilizers. So, our system uses the method of **fertigation** which comes under **precision irrigation.** This will save a lot of money and benefit the government on large scale.

Our project includes the use of temperature sensors which will help the farmers use their fertilizers precisely. They can carry out the method of fertigation in a more systematic and professional way.

So, our project can be a relief provider to all the Indian farmers who face problems while maintaining their fields. It can help in developing our current agriculture system by using modern technology at a low and effective price.

SOLUTION TO THE PROBLEM

Farmers who are interested to use this package can get this installed in their fields at a low price. After the installation process they can connect their devices to the system with the help of internet and get the information about their fields with ease. They can also irrigate their fields and provide fertilizers, pesticides, insecticides etc.

Farmers who want to use manure or organic fertilizers can install wire mess at the outlet of the tanks so that only the liquid containing the required nutrients can pass through the pipes and the leftover stays in the tank itself which can removed later. This process enables the farmer to provide organic fertilizers to their fields without facing the problem of water logging.

We all are aware that government distributes fertilizers, insecticides and pesticides to the farmers to provide them relief from the expensive nature of the fertilizers. So, instead of this process they can install our system in a specific area with the tanks filled up with fertilizers according to the requirement of the crops of that area and thus can provide fertilizers to the field of farmers with the help of specialized officials. This can help the government have a better control and management. It can also help them prevent corruption. And as specialists would be controlling the system so they can supply the accurate amount of fertilizers to the field which would further help the farmers get a better yield and also prevent loss of fertilizers.

FUTURE SCOPE

As the conclusions so far, state that our project is able to solve the problems of the problems of the farmers regarding the irrigation of their fields and proving their fields with fertilizers, we are planning to conduct more and more surveys in large numbers which would enable us to know more about the problems so that we can add more features to our project and make it more perfect and reliable.

After adding all further required features we are planning to implement it in real life in our own cultivable lands. Next, after the successful implementation of the practical use, we will present it to our agriculture department so that it can be used in a large scale and the farmers can be benefitted.

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