Design and Implementation of Automatic Low Cost Organic Fertilizer and Insecticides Making Machine

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***Abstract*- The use of organic fertilizer and insecticides forms the backbone & basic necessity of a poor farmer. The traditional methods of using chemical fertilizers and insecticides are not sufficient & satisfactory for increasing productivity of crop and to maintain the fertility of soil. Farmers use chemical fertilizers for growth of their crops. But there are many disadvantages to the crops if chemical fertilizers are applied to the soil. To reduce the efforts of farmer in preparing the organic mixture, by designing a low budget organic fertilizer and insecticides making machine. Whereas the chemical fertilizers are more costly in market, so it becomes difficult for poor farmers to purchase it. Organic fertilizer and insecticides manufacturing machine solves these both problems.**

***Index terms*- Power supply, IR sensor, Filter, servo motor, Arm7 Based Microcontroller, Mix Blender**

I.INTRODUCTION

India is an agricultural country. About seventy percent of our population depends on agriculture. One-third of our National income comes from agriculture. The use of organic fertilizer forms the backbone & basic necessity of a poor farmer. The traditional methods of using chemical fertilizers are not sufficient & satisfactory for increasing productivity of crop and to maintain the fertility of soil. Whereas the insecticides are more costly in market, so it becomes difficult for poor farmers to purchase it. Organic fertilizer and insecticides manufacturing machine solves these problems. The raw material is introduced in hopper and further it is mixed with the help of stirrer. This mixture is then passed to another large sized agitation vessel where it is kept for decomposition. In this way, this machine prepares fertilizer within 30 days. A fertilizer manufacturing machine requires less space & is less bulky as compared to the existing bulky machines. It also helps the farmers to start small business thereby making them self-dependent. Design & development of the machine is done taking into consideration various needs of farmers. To reduce the efforts of farmer in preparing the organic.

II LITERATURESURVEY

The literature concerned with farmers' preferences and satisfaction with primary retail pesticide suppliers is limited and not widely available in the public domain. However, marketing studies focusing on the purchasing behavior of farmers with respect to different production inputs are available. These reviews were largely published in the 1981's and 2011's and generally focus on production inputs such as fertilizer, seed, feed, and farm equipment.

III INDIAN FARMER'S BEHAVIOR

Funk and Downey analyzed Indiana farmers, focusing on fertilizer product/service needs, buying behavior, attitudes, preferences of farmers, and the manner in which this information could be used to develop product, price, promotion, and distribution policies for manufacturers and dealers. One hundred fifty central Indiana farmers from 12 counties were surveyed. Major findings were as follows: local fertilizer dealers, other farmers, and family members are the most widely used influence groups; most dealer contacts are initiated by farmers, not fertilizer dealers. Additional findings showed that other farmers are highly influential in dealer selection,

word-of-mouth communications among farmers are important in dealer selection, and importance is attached to the fertilizer dealer for providing various types of information such as price, product, technology, and application information. Two-thirds of those surveyed disagreed with the statement that price is the most important consideration in purchasing fertilizer, while two thirds agreed with the notion that establishing a good long-term relationship with one fertilizer dealer is more important than any price savings which might be possible by changing dealers frequently. The author mentions that demand for specific services was found to be dependent upon the characteristics of the farmers. Services listed as most important by respondents included condition and availability of application equipment, provision of information through staff, outside experts and farmer meetings, provision of custom application services, provision of soil testing services, plant tissue analysis, custom application of pesticides, and demonstrations. Only around 38 per cent of the farmers surveyed did not switch dealers at least one time in 1979. About 42 per cent of the respondents stated they had used at least three dealers within the last five years. Interestingly, only 45 percent of farmers purchased fertilizer from their nearest dealer. Several reasons were identified as influential in the decision to use more than one dealer.

IV PURCHASING BEHAVIOR OF FARMERS

Schrader quantified farmers' loyalty-related behavior in the purchase of farm supplies, compared the loyalty exhibited by farmers patronizing cooperatives and other types of farm supply firms, and examined the relationship between a patron's loyalty and his decision to voice complaints about firm performance rather than immediately switching his patronage. A loyalty index was developed as a composite of three measures: the proportion of total purchases made from the major supplier, the number of switches of suppliers occurring during a given period, and the number of outlets available. Another indicator of farmer loyalty was based on a sample of farmer's reactions to a hypothetical situation in which the product involved was offered by a competing supplier at a lower price. The production input studied relevant to this study was corn herbicides. A mail survey was administered to 917 corn herbicide purchasers in Illinois.

The results showed that the majority of farmers perceived that they had a number of alternative pesticide supply sources. Farmers agreed with the statement that they had a good working relationship and were very satisfied with their primary herbicide supplier. Even at the largest price reductions tested, some farmers indicated no action to inform or switch their primary supplier, and no more than 16 per cent indicated a switch without informing their current supplier. Farmers stated that good service and convenient location were the reasons for lack of switching primary suppliers. Lastly, Schrader found that the existence of alternatives and the presence of 10-20 per cent of farmers willing to change suppliers for a price advantage of as little as 2-3 per cent are sufficient to ensure price discipline within the market.

V GROWTH AND ECONOMICS OF PESTICIDE USE IN INDIA

According to Gandhi and Vasant pesticide industry is the most dynamic agricultural input industry in India, being substantially in private hands. Yet the pesticide use levels in India are among the lowest in the world. This paper presents an overview-analysis of the pesticide scenario in India. It develops a framework of the market environment within which the growth of pesticide use takes place in developing countries. It, then, uses this framework to study the growth and patterns of pesticide use in India. It finds that pesticide use in India is highly concentrated by crop and geographic area, and is therefore showing declining growth rates. A major reason appears to be very limited market development efforts by the firms leading to poor conversion of a large potential into effective demand. Output markets/prices, input prices, high yielding varieties and wage rates play important roles in determining use. However, many non-price factors are also very important. Pesticides are also seen as insurance by the farmers and therefore higher than optimum use is frequently reported. The new economic environment in India will offer ample opportunities for growth. However, the industry will need to look at the market environment more comprehensively and will need to play a proactive role in market development.

VI PROBLEM IDENTIFICATION

Nowadays most of the farmers are using chemical fertilizers for their crops. Due to this the productivity of crops as well as the fertility of soil is decreasing day by day. Also, the prices of these chemical fertilizers are more to farmers. Thus, it brings to our knowledge that the traditional methods are not sufficient and satisfactory for agriculture. Due to these, some major problems are identified & to over-come these problems some idea or concepts are developed and adopted. Following are the

VII. PROPOSED SYSTEM

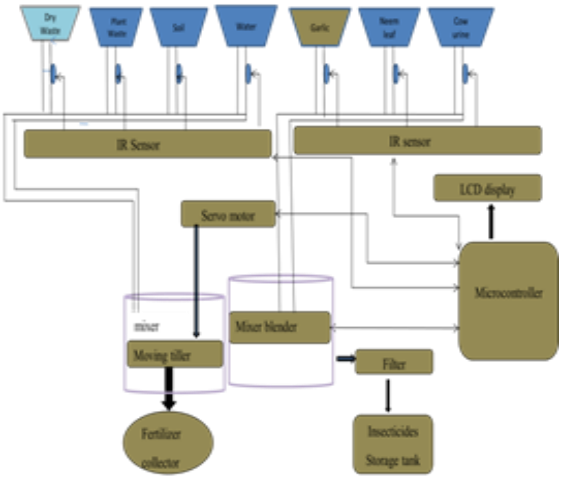

Fig.1. Block Diagram

A. Rotating Tiller

The main benefit of counter-rotating tillers is their independent blade movement compared to the wheels' motion. As the machine is pushed forward on the wheels, the blades spin in a counter clockwise motion to cut the topsoil; the blades do not rely on the movement compared to the wheels' motion. Operating much like the counter-rotating tiller, the dual- rotating machine has one extra feature: It can work in both forward and reverse blade motions.

Fig.2. Rotating Tiller

Considered a high-end tiller, this heavy-duty machine choice gives you the most flexibility in the garden. For example, you may be tilling some very soft soil using the forward gear motion but then move on to a soil area that is extremely compacted. You can automatically switch into reverse gear so that the tiller's tines cut deeply into the soil without much effort from you. Rear-tine tillers are usually larger by nature. You use them for larger jobs in landscaping, gardening, renovating and constructing. Because the tines are rear-mounted, work areas are limited to more open spaces away from buildings, sidewalks and other objects.

B. Servomotor

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Doe to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc. Servo motors are rated in kg/cm (kilogram per centimeter) most hobby servo motors are rated at 3kg/cm or 6kg/cm or 12kg/cm. This kg/cm tells you how much weight your servo motor can lift at a particular distance. For example: A 6kg/cm Servo motor should be able to lift 6kg if the load is suspended 1cm away from the motors shaft, the greater the distance the lesser the weight carrying capacity. The position of a servo motor is decided by electrical pulse and its circuitry is placed beside the motor. It consists of two parts: 1.Controlled device 2.Output

C.IR Sensor

The performance of IR sensors for target detection is analyzed with model SENSAT. The model calculates the radiometric relations for passive IR sensors with up to three homogeneous objects in the instantaneous field of view. For the atmospheric part, the computer code LOWTRAN-6 is used within SENSAT. The sensor model has been improved by introducing a noise model for quantum detectors. It takes into account photon noise, thermal detector noise, and g-r

and 1/f noise. In combination with a spectral band optimization with respect to the SNR an efficient tool for the radiometric analysis of IR sensor performance is presented. The comparison of model calculations in the 3–5 μm and 8–14-μm bands with experimental measurements yields excellent agreement.

VIII.CONCLUSION

By opting EPICS as our elective we have learnt many new things like team management, time management, how to design a product, how to find out the problems and their solutions, how to implement them within the budget and best of all is interactive skills. Throughout the course we have implemented whatever we learnt and designed a portable organic mixture machine. This machine was built within the budget as a cost friendly to the small and medium scale farmers. Users were satisfied with the machine when after testing the machine because of the prior research during the design phase. There is huge scope for the next level extension, to make a more robust machine with the technology like IoT and Robotics.

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