INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 5, Issue 3)
Available online at: www.ijariit.com

A study of different factors required for better crop planning system

Jyoti Deone
done.jyoti@gmail.com
Ramrao Adik Institute of Technology, Navi Mumbai

Dr. Khan Rahat Afreen
siddique.rahat@gmail.com
Deogiri Institute of Engineering and Management Studies, Aurangabad

ABSTRACT

Today's farmers are facing various challenges in agriculture, some of them are arises due to natural resources such as soil optimization, land allocation, water management, and other resources. This can be controlled by effective agriculture crop planning and other challenges are the farmers have a lack of awareness in market information due to this they are not getting the actual price of their crop. Also, the farmer not having enough information about different policies and scheme provided by the government. In this paper, we provide different methods for increasing crop planning and crop productivity. This paper gives the general idea of effective crop planning and increasing productivity with comparing different parameters and suggesting the different daily need crops according to their soil type and importance of irrigation methods and there use in farming.

Keywords— *Agriculture, Land, Crop, Soil, Irrigation*

1. INTRODUCTION

Agriculture plays an important role in India. Among the entire population fifty-eight % Indians are keen about farming then conjointly solely 1/3 rd area is brought below the irrigation. The assembly of the crop is incredibly less as compared to the entire population. As comparing with population the necessity of food is additionally needed. For increasing crop, most of the farmers, scientist, researcher, Indian government are providing to place further effort and new improved technology are introduced to a farmer for more production of the crop. The results of this effort are to extend food production as compared to previous. A large amount of data is stored in the agricultural field so according to requirement, we can extract the required data by using different data mining algorithms. The farmers are unable to adopt new technology because of their unawareness and communication problem [1]. In this paper, we provide different factors and how to use those factors with different techniques for increasing the productivity of the crop. Different hardware software technologies are used for estimating the new techniques and suggesting new crop depending on their available resources for the agricultural process. This study majorly aims to gather the data regarding new techniques on different factors for increasing the crop productivity in available resources [2].

Forgetting a lot of profit with less quantity of resources agricultural researchers will use improved crop designing through developing the different aspects [3]. Agriculture plays a crucial role within the system management; natural fertilizers and compost will boost up soil fertility with none compound effects. Crop planning is aimed to boost the income and output along with lesser input price and capital. A number of factors form Crop designing, out of these few some may be optimized and some may not. Several ways are available in the market to resolve crop planning issues like algorithms, improvement tool, technology etc. however still it wants a lot of improvement to provide the most effective best solutions [4].

Agriculture is the most important application in developing countries like Bharat. Use of data technology in agriculture will modification true of deciding and farmers will yield in a higher manner [5]. Data mining plays an important role in deciding on many problems associated with agriculture field. In Bharat heap of individuals aren't privy to the new techniques for higher crop planning and e selling strategy [6]. Thus farmers and traders are to be allowed to look at all data and services connected with Agriculture manufacture Market Committee, trade goods arrivals and costs, and purchase and sell trade offers. This helps the farmers to bid for the most effective costs across markets.

Classification could be a data mining technique that assigns things in a very cluster to focus on the category. The aim of classification is to accurately imagine the target class of every case within the knowledge. There are many challenges concerned in the selling of agricultural manufacture [7]. Purpose of this work is to search out appropriate knowledge models that deliver the goods high accuracy and a high generality in terms of yield prediction capabilities. Indian agriculture is stricken by many problems; a number of them are natural and a few others are manmade [8]. It's not solely the Indian agriculture sector that's facing problems; different developing countries are too. A number of the issues round-faced within the African agriculture

sector. Many open supply tools are on the market for extracting knowledge and machine learning tool. There are two ways to understand problems that is we can say glass half full or half empty if we consider half-full glass then no problem of water so before solving any problem first, understand problem [9].

2. LITERATURE SURVEY

To improve production, intended agriculture is essential. All agriculture problems can be controlled through proper crop planning. Crop planning is a multi-objective optimization problem, which was solved by using the numerical formulation and different computational methods. The main aspect of crop planning is soil optimization, land optimization and irrigation system [10]. Farmers getting to produce new crops to provide a lot of margins, now a day's farmer aware of new technology and new marketing strategy through this they can communicate and compare crop productivity. Main aim is to increase farmer's awareness and introduce new techniques and obtain better crop productivity. In this paper, we focus on few parameters like information related to the type of soil and related area and crop in table-1 due to this farmer get an idea which crop he/she should grow according to their soil type [11]. The main aim is to get appropriate knowledge that delivers goods with better quality and a more generality with relevancy parameters particularly soil kind, land production and chemical fertilizer. For this purpose, various kinds of DM techniques were evaluated on completely different data sets [12]. Most popular techniques for data mining is Association rules, Classification, and Regression. The various data mining techniques used for determination different agricultural downside has been mentioned.

3. AWARENESS OF NEW TECHNOLOGY

The Government of India has started different programs to increase the knowledge of crop production and productivity of various crops such as Front Line Demonstrations and Extension through a network of Krishi Vigyan Kendras (KVKs) as per details are given below: [13]

- **NMAET:** The intent of this work is to reform and support Agricultural expansion to facilitate freedom of suitable technologies and enhanced agronomic practices to the farmers.
- **SMAE:** It focuses on knowledge establishment and superior make use of correct technology in agriculture and linked sectors. Agricultural Technology Management Agency (ATMA) is the main scheme under the SMAE of NMAET. The Scheme is implemented in 652 districts of 29 States and 3 UTs of the country. Under the Scheme, the grant is released to State Govts. for revitalizing their extension system and making available the latest agricultural technologies farmers training, demonstrations, exposure visits, exhibitions, Kisan meals, farmer-scientist-interactions, mobilization of farmers interest groups and setting up of farm schools on the field of progressive farmers. Govt. also creates awareness among farmers through print and electronic media.
- **The Kisan Call Centre (KCC) Scheme:** is also implemented across the country for the benefits of farmers. The main aim of the Scheme is to answer queries of farmers on telephone calls in their own dialect. A countrywide common 11 digit toll-free number 1800-180-1551 has been allotted for Kisan Call Centre. Increase in awareness about crop insurance will help farmers to negotiate natural calamity in a better way. As per sources, currently, crop insurance penetration is just 15% which is very low. Farmers must be encouraged to adopt an integrated farming system model i.e. farmer should grow field crop, do horticulture, dairy, fishery, Vermicomposting, mushroom cultivation and tree plantation on the boundary of the field. These will give them incremental earnings. A soil health card is an excellent project of Govt. to help the farmer to know which nutrient is missing in his field so that he can put only that specific nutrient fulfilling fertilizer. Currently, farmers put each and every possible fertilizer which increases his input cost.

4. CROP PLANNING IMPROVEMENT PARAMETER

4.1 Soil category

Soil fertility is the capability of the soil to uphold plant development and make consistency in crop production. This can be improved by using natural and chemical manure. Further useful data can be derived through Nuclear Techniques which help in improving soil nutrient capacity for growing and increasing crop production with less chemical effect and without affecting the environment. Soil can be classified as Black, Red, Mountain, and Desert. Fertilizers are used to increase soil nutrient for improving crop production [14]. For increasing crop productivity we need to see which soil type is suitable for a particular crop in which particular region. By this survey, farmers get information which crop should be grown according to their soil type. Table 1 describes the different type of soil with different regions. Every farmer has the soil card through this soil card he gets all information related to soil and their nutrient so with the help of this soil card farmers can understand type soil.

Table 1: Different type of soil with suitable crop

Type of soil	Region in India	Type of daily need crop
Alluvial soil	Northern India	This soil is rich nutrient and it has quick draining properties so it usually needs to grow the crop like cotton, rice, bajara, oilseeds, maize
Black soil	Mostly you can find this Soil in the river valley.	This soil is rich in iron so it usually needs to grow most popular in cotton, citrus food and cereal crop.
Red Soil	Chattisgarh, Orissa, western ghats.	This soil contains iron oxides it useful to grow rice wheat, ragi, fruits like mango, orange.
Laterite Soil	Tamilnadu, Karnataka, Kerala, Orissa	This soil is acidic in nature, so it's not so much fertile generally it used to make bricks and cultivate to cotton, rice, and wheat.
Arid soil	Western of Aravalli	This soil is sandy and low clay content, it useful to grow wheat, cotton, corn.

Figure 1 illustrates the major components of the soil-plant system in an agricultural context with a focus on food products (rather than fibres or timber). Soil health, as the condition of the soil with respect to its capacity to support healthy plant growth, encompasses agronomic as well as soil quality factors. Soil-borne pests and pathogens, weeds, soil structure and fertility are all factors that can be managed directly by soil management and agronomic practices.

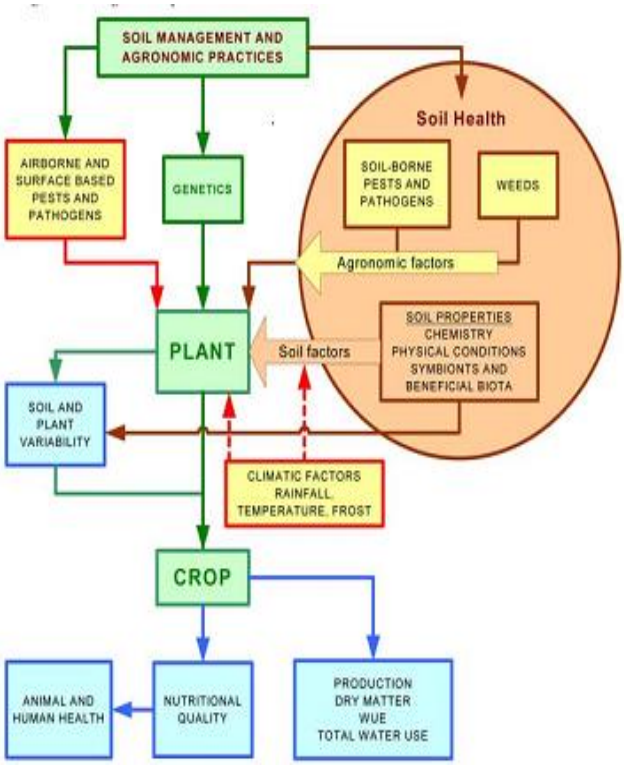

Fig. 1: Different components of soil for the cropping system

4.2 Land improvement

The land is a vital substance in crop production. As per land kind, the farmer has a choice to choose which crop to take in specific land type. The land is classified in 3 parts, one-time crop land, two-time crop land and three-time crop land. In one time crop, 1 crop will be taken in the whole year. 2-time crops are taken in a year for two times. In 3-time cropland, 3 crops are taken in the whole year. Sustainable agriculture is a method of managing crop ecology in order to maintain reproduction by considering it will not affect another ecology system. One technique for sustainable agriculture is an intercropping that is multiple crops are planted in the same area.in intercropping many factors such as time period, diseases, growth areas must be considered because these factors are affected for risk minimization [16]. Because of ecological diversity if any one crop is affected by diseases then it will be destroyed. The Linear Programming (LP) method is used for better intercropping agriculture. Basically, the LP method used to find a total cultivating area with maximum income.

4.3 Irrigation improvement

Natural rainfall is not sufficient to agriculture then they receive additional water from irrigation technique. For increasing the crop production water management is a very important application. India holds the second position in terms of irrigation in the planet, the one-third of cropped land is below irrigation. Genetic algorithmic program and applied mathematics are largely not to solve the irrigation [15]. An optimization model for intercropping designing so as to increase total financial gain whereas decrease the risk [17]. Soil fertility is a crucial issue to live the standard of soil because it point towards the extent to that it will support vegetation. Maximum farmers use fertilizers approximately. However, the use of fertilizers in correct quantity could be important as surplus or short addition will hurt vegetation and cut back production [18]. Major techniques for DM are Association rules, Classification, and deterioration. Various algorithms from mentioned data mining techniques are utilized for identification of dissimilar agricultural downside has been mentioned [19]. Different types of methods are used to provide irrigation water to farming. Like shown in below figure Surface irrigation fig-2 in this technique the water is divided into every row of plant soil. The water level is most important neither more nor less of plants length.fig-3 describe sprinkler irrigation in this technique water is pumped through the pipe and then sprayed onto crops through sprinkler head. Fig 4 shows the drip irrigation or we can say localized irrigation through this method save water in the feature. Two ways water can give either on the soil surface or directly give to root by the network it can be done with the help of narrow tubes.

Fig. 2: Surface irrigation

Fig. 3: Sprinkler irrigation

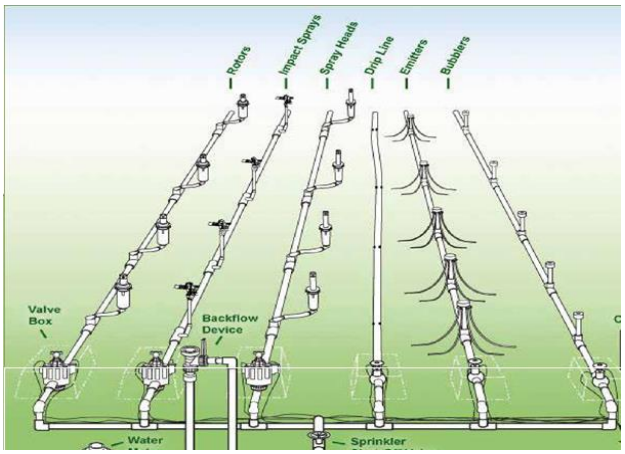

Fig. 4: Drip irrigation

Most of the villages in India have water problem is a very major problem for solving this farmer can use irrigation technique to increase crop production. Table 2 Sprinkler and drip these methods have been recognized for efficient use of surface as well as groundwater. Because of the cost of this advantage is high but out of total cast Micro Irrigation system help 40% by the central government and 10 % by the state government and remaining 50

will be borrowing own resources or soft loan from a financial institution.

Table 2: Comparision of different crops on different irrigation

Crop Name	Sprinkler Irrigation		Drip Irrigation	
	Water saving %	Yield increase%	Water saving %	Yield increase %
Cotton	46	58	36	50
Onion	46	53	33	23
Potato	46	4	46	79
Bhendi	28	19	25	15

5. CONCLUSION

Crop planning system is a very important part to improve the crop production and productivity of crop.in this paper we describe the different factors that help to improve the crop planning. In this paper we consider three main factors like different type of soil, land type through this intercropping method used to maximize income and minimize risk, irrigation methods are used how to use minimum waters for cropping system. Through these factors, farmer understand with minimum resources how they get more production of the crop. Also, they get the knowledge of new agriculture techniques and for accessing this government also give support in term of different insurance and police scheme. For understanding all government schemes and new farming technique the farmer's awareness is a very important part of agriculture. Communication is a very important part of marketing if farmers get information to their own language depending on that number of applications are introduced.

6. REFERENCES

[1] Gandge, Y., and Sandhya. (2017). "A study on various data mining techniques for crop yield prediction". 2017 International Conference on Electrical, Electronics, Communication, Computer, and Optimization Techniques (ICEECCOT).

[2] Dury, Schaller, Garcia, Reynaud, Jacques Bergez "Models to support cropping plan and crop rotation decisions. A review of" decisions. A review. Agronomy for Sustainable Development, Springer Verlag, 2012, 2 (2), pp.567-580.

[3] Sumitha Thankachan, Dr S.Kirubakaran "E-Agriculture Information Management System" IJCSMC, Vol. 3, Issue. 5, May 2014, pg.599 – 607 ISSN 2320–088X.

[4] Gao Jun-Feng, LI Chang-Feng, Zhang Hong-Hui., "Soil Spatial Analysis And Agricultural Land Use Optimization By Using GIS", Chinese Geographical Science.Volume 13, Pp. 25 - 29, 2003.

[5] Yan Bo and Bu Yibi, 'Agricultural Marketing System in China', Journal on Agricultural Marketing Information System, 2003, vol 15, issue no 4, pp.no 33-37.

[6] Jharna Majumdar, Sneha Naraseeyappa and Shilpa Ankalaki" Analysis of agriculture data using data mining techniques: application of big data" Banga-lore India Springer-Verlag London Limited 2017.

[7] Xindong Wu · Vipin Kumar · J. Ross Quinlan · Joydeep Ghosh · Qiang YangHiroshi Motoda · Geoffrey J. McLachlan · Angus Ng · Bing Liu · Philip S. Yu · Zhi-Hua Zhou · Michael Steinbach · David J. Hand · Dan Steinberg" Top 10 algorithms in data mining "Springer-Verlag London Limited 2007.

[8] Yethiraj N G" Applying Data Mining Techniques in the Field of Agriculture And Allied Sciences" Vol 01, Issue 02, and December 2012 International Journal of business intelligent ISSN: 2278-2400.

[9] Nidhi Dwivedy" Challenges faced by the Agriculture Sector in Developing Countries with special reference to India" in the international journal of rural studies vol. 18 no. 2011.

[10] S.Sarany, Dr T. Amudha Coimbatore, India "Crop planning optimization re-search-A detailed Investigation"2016 IEEE in International conference on advances in computer application (ICACA).

[11] Ramesh D, Vishnu Vardhan B., "Data Mining Techniques and Applications to Agricultural Yield Data", IJARCCE, Vol. 2, Issue 9, September 2013.

[12] Mucherino, A., Papajorgji, P., and Pardalos, P. (2009), "Data mining in agriculture" (Vol. 34), Springer.

[13] M.S.Nain, Jyoti Ranjan Mishra" A Study of Farmers' Awareness on Agricultural Insurance schemes in southern Hariyana" Vol. 53, No. 4, 2017 (75-79) Indian Journal of Extension Education 2017

[14] Josiah Adeyemo, FaizalBux, et al., "Differential evolution algorithm for crop planning Single and multi-objective optimization model" International Journal of the. Physical Sciences Vol. 5 (10), pp-1592-1599, 2010.

[15] Josiah Adeyemo, Fred Otieno, "Maximum Irrigation Benefit Using Multi-objective Differential Evolution Algorithm (MDEA)", Ontario International Development Agency, ISSN 1923-6654 2007.

[16] Jitimon Angskun; Thara Angskun" An Optimization Model for an Inter-cropping Planning System"2009 International Conference on Information and Multimedia Technology.

[17] Amrutha A, Lekha R, and Sreedevi, A. (2016). "Automatic soil nutrient retention and fertilizer dispensary system". 2016 International Conference on Robotics: Current Trends and Future Challenges (RCTFC).

[18] Vibha; G.M. HarshaVardhan; S.J. Prashanth; P. Deepa Shenoy; K.R. Venugopal; L.M. Patnaik" A hybrid clustering and classification technique for soil data mining"2007 IET-UK International Conference on Information and Communication Technology in Electrical Sciences (ICTES 2007).

[19] Sanjay D. Sawaitul, Prof. K.P. Wagh, Dr P.N. Chatur, "Classification and Prediction of Future Weather by using Back Propagation Algorithm-An Approach", International Journal of Emerging Technology and Advanced Engineering, Vol. 2, Issue 1, January 2012, pp. 110-113.

