

## **Implementation of Hydrogel in farming practice**

**Swayam Prakash Dash**

Junagadh Agricultural University

### **Abstract**

While we talk about farming or agriculture the things which primarily comes to our mind are land and water. To build infrastructure for booming population we degrading the agricultural land. As well as due to pollution, uncertainty in precipitation, climatic changes crops water demand also not fulfil. For sufficient supply of growing needs of increasing population we have to improve the productivity by increasing the yield of crop. In the process of gaining higher yield we must have to look about the method which is sustainable, affordable, and adoptable. While applying irrigation we take care about the efficient use of water and reduce the unnecessary wastage of water. For efficient irrigation modern irrigation methods like micro irrigation (sprinkler, drip), sub surface irrigation methods are there, but in these methods initial installation cost, maintenance cost are higher that why many Indian farmers are getting reluctant to install this system as many of the farmers in India are small and marginal farmer. To overcome all these above mentioned issues use of Hydrogel is a better option.

### **INTRODUCTION**

In current years, due to the booming population all over the world, excess use of water and increasing losses of water in many sectors, scarcity of water is a major issue. Many reports say that almost 60% to 70 % of water is used for irrigation over the world. In irrigation water loss is more to reduce this modern irrigation method are introduced like sprinkler, drip irrigation methods. But these methods have some limitations like higher installation cost, higher maintenance cost, and also not adoptable in heavy clay soil.

About 55% of people in India doing farming among them only 1 % of farmers are large farmer other are small and marginal farmer. Due to higher capital investment many farmers not adopting the drip and sprinkler irrigation methods.

By considering all these above challenges, use of hydrogel in agriculture is a better solution for this.

Hydrogel is hydrophilic in nature. Basically, it is a water-absorbing polymer. Hydrogel can retain a very large amount of water about 400 times its weight and gradually release water. It acts like a reservoir at the root zone of plants. So moisture is present in the soil for a long time after applying Irrigation.

Hydrogel is more useful in arid and semi-arid regions to maintain an optimum level of moisture at the root zone. It can be useful in all types of soil and also in all topographic conditions. It can reduce the frequency of irrigation. Hydrogel encourages the growth of roots, improves aeration, and reduces the compaction of soil. Hydrogel absorbs fertilizers and nutrients and releases them in a controlled manner.

Hydrogel supports the plant for its growth during dry period, reduce water loss. It also increases the uptake of nutrient. Hydrogel helps to reduce soil erosion, improve crop health. Hydrogel has a contribution in higher yield, water conservation.

Hydrogel is made up of synthetic polymer including polyacrylamide, polyvinyl alcohol, polyacrylic acid. Biodegradable hydrogel made from starch, cellulose etc. the polymer are undergoes various chemical reaction that cross links the polymer by use of cross linking agents.

### **USEFULNESS OF HYDROGEL**

#### **1. Water retention and efficient irrigation**

As hydrogel retains water, during dry periods it gradually releases water and helps plant to grow. It reduces the frequency of irrigation.

#### **2. Soil structure improvement**

Hydrogel enhanced soil porosity which helps in good root penetration.

#### **3. Preventing topsoil from erosion**

As soil moisture is maintained almost all the time it reduces the erosion of soil.

#### **4. Improve germination and increase the survival rate**

Hydrogel provides a suitable environment for seed germination so that the efficiency of germinating is also increasing.

#### **5. Higher crop yield and Quality**

As soil moisture is maintained and nutrients also supplied consistently plant growth is enhanced and productivity also increases.

### **FUTURE ASPECTS OF USING HYDROGEL**

In the present scenario, synthetic hydrogel is used in agriculture, which takes more time to degrade. If we use natural hydrogel which can be easily degradable in soil, then it reduces the chances of soil toxicity. Application of hydrogel is quite easier and economical, if we aware farmers about this there is a chance of more adoption of hydrogel.

### **CONCLUSION**

The use of Hydrogel is a better solution for water management, improving soil structure, and also supporting plant growth. Especially it is useful for the water-stressed region, and arid and semi-arid regions. However, overuse of hydrogel is risky because it can create a barrier for deep percolation and groundwater recharge. We have to look after the production of more natural hydrogel which is biodegradable and eco-friendly.