

The Prospects of Micro Irrigation in Chandel District of Manipur

Kangjam Sonamani Singh

Krishi Vigyan Kendra, Chandel, Manipur

Corresponding Author: sonamanisingh@gmail.com

A huge percentage of people around the world lack adequate access to water: a basic element of life. The total amount of water on the earth, as per scientific estimates, is about 1400 million cubic kilometres, which is enough to cover the earth with a layer of 3000 m depth. Out of this, *fresh water* forms only a small portion of this huge quantity. Just only 2.7% of the total water available on the earth is fresh water and the remaining is in the form of saline water in seas and oceans. Almost 75.20% of available fresh water lies frozen at polar regions and another 22.60% is present as ground water (50% of which is available within extractable depth). The rest of the water quota is available in lakes, rivers and moisture in atmosphere, soil and vegetation.

With keeping in mind, the erratic and highly unreliable rainfall due to climate change and the ever-increasing demand for water from different sectors, a lot many water management strategies and techniques have been introduced to conserve water and increase the existing water use efficiency in the Indian farming so that the farmers may have an assured means of sustainable income. Out of the many methods, one such method introduced relatively recently in Indian agriculture is micro-irrigation, which includes both drip and sprinkler method of irrigation. Micro-irrigation (MI) has indeed proved to be an efficient method in saving irrigation water in the fields and thereby increasing long-term water use efficiency.

In sprinkler irrigation, water is sprayed into the air and allowed to fall on the ground surface somewhat resembling rainfall. This spray is developed by the flow of water under pressure through small orifices or nozzles. The pressure is usually obtained by pumping. With careful selection of nozzle sizes, operating pressure and sprinkler spacing the amount of irrigation water required to refill the crop root zone can be applied nearly uniform at the rate to suit the infiltration rate of soil. This system of irrigation is found to reduce energy (electricity) requirement, weed problems, soil erosion and cost of cultivation. Investment in micro irrigation also appears to be economically viable, even without availing state subsidy. Despite all these proven

benefits, as of today, the adoption rate of sprinkler method of irrigation (SIM) is quite less (3.30 percent) compared to its total potential, which is estimated to be almost 50.22 million hectares. In contrast to the general presumption, economic reasons may not always be the sole reason for the low adoption rate of micro-irrigation techniques. Farmers having lack of awareness about its actual economic and resource benefits may be the major factor. Therefore, apart from the numerous promotional schemes being offered, the chapter suggests various other measures i.e. technical as well as policy interventions for increasing the adoption of this water saving technology.

Scope for Sprinkler Irrigation in Hilly District of Chandel

Water is the backbone of agriculture, irrespective of the crop grown or the area or size of land holding. Serious efforts have been made in the past to increase the land under irrigated area through construction of large number of surface irrigation projects and through ground water resources since the first five-year plan. As a result, the irrigated area has increased by almost 250 % from what it was in 1950-51. At present, out of 139.9 M ha of net sown area, about 45.2% (63.2 Mha) is irrigated and remaining 54.8% area is sown under rainfed condition (MoA, 2009-10). But with the existing practices, only 40% water use efficiency can be achieved.

Unplanned, indiscriminate, unscientific and inefficient use of water resource over the years has led to disastrous effect challenging long term sustainability of agricultural production in the nation. As a result, utilizable water resources for agricultural sector are becoming increasingly scarce owing to ever increasing population, abnormalities in weather and depleting ground water resources besides ever-increasing competition from household and industrial sectors. Traditional surface methods of irrigation cause water loss in the form of seepage and deep percolation, highly uneven distribution of water, promotes weed growth besides creating salinization, water logging thus, affecting the land and crop productivity. As per available estimates just increasing water use efficiency by 10%, the country

can gain almost 50 million tons of additional food grain production from the existing irrigated area. Therefore, it is essential to achieve maximum output per unit of input in agricultural production. Technological innovations are to be utilised to achieve the dual purpose of efficient utilization of every drop of water to obtain higher crop productivity and optimal use of water resource in agriculture to boost the economic status of the poor farmers. In this backdrop, sprinkler irrigation is a method of water application which plays a vital role in achieving all these criteria. It is possible to attain very high irrigation efficiency through the sprinkler irrigation, which is not generally feasible under surface irrigation methods. This method has very high irrigation efficiency, even in hilly terrain and light soil and which in turn can save water upto 30 to 60 %. The concept of sprinkler irrigation is gaining popularity in the recent past because of two important reasons *viz.*, impact of climate change resulting to erratic rain and long periods of dry spell and secondly due to labour shortage.

Advantages of sprinkler irrigation

The relative advantage of sprinklers over surface methods will vary from places to place and time to time. Some of the advantages of sprinkler method are detailed below.

High efficiency in water conservation

Sprinkler irrigation enables uniform water application. In this method, water penetrates only upto the required root zone with no wastage through deep percolation. Hence, with the same quantity of water, it is possible to increase the area by one and a half time. Higher levels of spatial uniformity and efficiency than conventional irrigation is achieved by sprinkler systems. This method of irrigation can be used for almost all types of crops except paddy and jute. As much as 35-57% water can be saved as compared to other surface methods of irrigation. This method of irrigation does not require any particular skill.

Judicious use of land, soil conservation, labour saving & control of leaching of salts: Sprinkler systems can be used in fields which cannot be otherwise irrigated by the conventional methods due to severe undulating topography, steep slope, high soil porosity and shallow top soil. Issues like soil erosion, compaction of soil during irrigation and land

loss for formation of water course and field channels can be avoided. Further, this method irrigation controls leaching of salts.

Good yield of crops: Healthy crop growth and higher yields with good quality can be realised as the soil moisture in the crop root zone will be continuously maintained at optimum levels through sprinkler irrigation method. It is well suited for providing life-saving irrigation at critical stages

Saving of labour: Land levelling is not required for sprinkler irrigation to function. Hence it saves labour. Sprinkler irrigation is automated. The lateral pipes need to be shifted only once in six to eight hours; it generally leads to reduced labour requirements. Fertilizer and pesticides can also be applied through the sprinkler system thus, affecting saving in labour costs. Sprinkler irrigation is also known to be associated with less infestation of pests and diseases thereby, cutting down the plant protection costs. Also, the operation of the system is farmer-friendly.

Introduction of Sprinkler in Chandel, Manipur



Fig. 1 Sprinkler irrigation technique being implemented in the cabbage fields of Purumchumbang village

Sprinkler irrigation technique has been introduced in cabbage fields of Purumchumbang village of the district (Fig 1). Cabbage is one of the most popular winter vegetables grown in Chandel and cabbage plants thrive well in relatively cool moist conditions. Generally, farmers grow locally available varieties and irrigation practices are rarely adopted. But cabbage requires continuous availability of moisture in soil and irrigation significantly increased their yield and quality. The estimated daily irrigation water requirement of cabbage crop was observed as 4.66 l/4plants during early stage and 6.62 l/4plants

during peak growth stage. Fertigation in the form of three to four split doses of liquid nitrogen (100 kg N/ha) was applied through sprinkler irrigation after 5-6 weeks of transplanting.

Pre-intervention, the farmer was confined to only single crop of paddy during kharif; leaving the

field fallow during rabi season. The returns from farming were very nominal. Sprinkler irrigation was found to be a very suitable method of irrigation, which provides uniform supply of water. It encouraged the farmer to diversify the cropping system profitably with cabbage during the rabi season. He got a yield of 110 t/ha.
