



A Study on Sloping Agricultural Land Technology for Tribal Empowerment : With Special Reference to Jhadol and Kotra

KEYWORDS

Tribal, Water Management, SALT, Agriculture

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ABSTRACT In India, agriculture contributes 40% to our country's GNP and gives subsistence to 70% of our population but yet 1/3 of our total geographical area is drought-prone because we are dependent upon the monsoons which can be erratic. Drought-prone areas have to be provided water not only for human and cattle consumption but also for irrigation. Many times even after good monsoons water is not available only because of lack of proper management and storage.

The southern part of Rajasthan is a hilly, undulating, semi-arid, remote tribal region. With an area of 17,279sq km and population of over 2 million, the district of Udaipur is located in the southern part of the state.

Water Management is the cheapest and purest source of water is rain water. Harvesting of the water in pond, lakes, wells, tanks and reservoirs helps to preserve this water so that it can be put to varied uses later on.

The paper talks about Slopping Agriculture Land Technology (SALT). Salt is a package technology on soil conservation and food production. SALT integrates different soil conservation measures to increase ground water level of sloppy land.

Introduction

The studied area (Kotra & Jhadol) is a cantonment in the south-west of the District Udaipur, Rajasthan, situated about 38 miles south-west of Udaipur city. The Kotra or bhomat consists of 242 villages, with 16,738 inhabitants, more than two-thirds of whom are Bhils. One important river of Kotra tehsil is Wakal discharges into the Sabarmati a few kilometers downstream of Kotra village. Kotra region receives only 742 mm rainfall on 25 to 30 rainy days per year. In this area Rajasthan Bal Kalyan Samiti has evolved a project called "Community Based Water and Livelihood Enhancement in Mandwa Cluster Macro- of Remote Tribal Region" which includes tribal dominated areas. It is covered in the survey of India Topo sheet number 45 H2 & H3.

This area is known as underdeveloped, remote and backwardness. The South Rajasthan represents semi-arid climate characterized by concentrated and variable rainfall and higher frequency of dry spells during the rainy season. Even if these may not cause complete crop failure, they have significant negative impacts on crop yields and productivity, and ultimately on people's livelihoods. Groundwater recharge potential reduced through more concentrated rainfall over shorter periods of time resulting in excessive run-off in turn resulting in higher stress on groundwater dependant agricultural system.

The main challenges in the area are identified as follows:

- Fast depletion of soil due to erosion.
- Irrigation is limited to 10% of total privately owned land.
- Limited knowledge about modern day agriculture
- Lack of knowledge and skills for alternate employment
- Limited work opportunities beyond Kharif season.
- High incidences of migration.
- Human and cattle population has to walk long distances for safe drinking water.

Some of the techniques used for Water Harvesting and Conservation-

Some of the techniques which can be used to improve the productivity of sloppy land are discussed below.

Gully Plugs-

Gully plugs are constructed for preserving soil moisture and preventing soil erosion. They are earthen embankments

which also act as a grade stabilization structure. Apart from preventing erosion, gully plugs enhance the deposition of silt load and helps in recharging ground water table.

Check Dams-

Check dams are small barriers located in narrow streams with high banks; built across the direction of flow of water on shallow streams to enable water harvesting. Check dam is a small dam which can be temporary or permanent. As per the topography of the working area, check dams were built across the hill with the help of villagers. The site selected for check dams should have sufficient thickness of preambled bed to facilitate recharge of stored water in short time span.

Trenches-

Kotra area is characterized by hilly and sloppy regions, hence trenching enhances the amount of water that infiltrates the soil and hence minimizes erosion. Contour trenches are dug on contour lines and helps sustaining good quality soil. Major objective of building trenches is to conserve soil and water so as to enhance vegetative growth.

Stone Bunding-

Stone bunding is done to reduce soil erosion and conserve soil moisture by piling stones in a single line or making bunds. The area lies in Aravali ranges and because of un-even land forms, Cultivation is very low and soil erosion is too high.

Farm Ponds-

Farm ponds are basically small size rectangular trenches will collect run-off water in agricultural fields. Interconnectivity of farm ponds could not only result in effective ground water recharge but also dilute the contaminants in ground water. Dug wells would also serve similar purposes.

Gabion-

This is a kind of check dam being commonly constructed across small stream to conservestream flows with practically no submergence beyond stream course. The boulders locally available stored in a steel wire mesh and are tied up in the form of rectangular blocks. This is put up across the stream to make it as a small dam by anchoring it to the stream banks. The height of such structures is around 0.5 m and is normally used in the streams with width of about 10 to 15 m. The excess water overflows this structure storing some water to serve as source of recharge. The silt content of stream water

in due course is deposited in the interstices of the boulders to make it more impermeable.

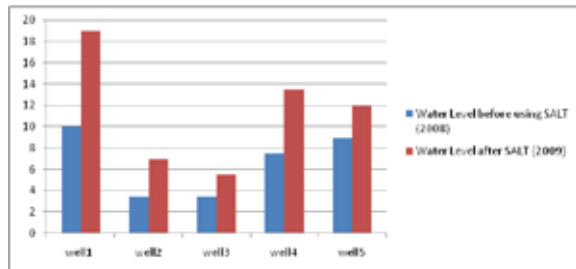
A case study:

Here a case study has been discussed below to reveal the importance of the agriculture technology in Sloppy Area. The case study covers a sloppy hill situated in the village Parevi (Jhadol) a tribal dominated village. In the year 2008, Various efforts by a leading tribal devoted NGO (RBKS) with collaboration to WFI(Well for India) were made to improve the ground water level of the land, so that the farms situated at Sloppy area of the hill can be utilized in a better way. Earlier, the rapid flow of water from the hill causes soil erosion and lower ground water level for the farm at the slope of the hill.

Five wells are situated at this hill. These wells used to become draught in the months of May, June every year. For the purpose to make these farms more productive, 3 Farm ponds, 1 NaalFaaad, Trenches and Guliplugs were constructed on this hill. Following table indicate the comparative recordings of water level (Before and after using SALT) of 5 wells situated at that hill.

Table1: Comparison of ground water level before and after using SALT.

Wells	Depth	Water Level before using SALT (2008)	Water Level after SALT (2009)
Well 1	70 feet	10	19
Well 2	45 feet	3.5	7
Well 3	50 feet	3.5	5.5
Well 4	58 feet	7.5	13.5
Well 5	65 feet	9	12



Above graph clearly represent a hike in water level after applying SALT technology over the sloppy area of that hill. To analyze the impact of these efforts on ground water level one tail t-test is conducted. Following hypothesis is taken for the same purpose.

Null Hypothesis of the Study- There is no significant difference in water level before and after using these technologies.

Alternate Hypothesis of the Study- There is significant increase in water level after using these technologies.

Table2: t-test table

	Water level in 2008 (Nov. Month)	Water level in 2009 (Nov. Month)
Sample Size	5	5
Mean	6.7	11.4
Standard Deviation	3.05369	5.40139
Calculated t-value=-1.6938	Critical Value=1.64	Reject Null Hypothesis

The calculated t- value is found to be greater than critical value. Therefore the null hypothesis is rejected that means alternate hypothesis is accepted proving that there is significant increase in water level of the studied wells after using SALT. The statistical values clearly underscore the importance of using these technologies in sloppy areas.

Conclusion-

Southern Rajasthan is surrounded by Aravali Hills. Udaipur District's Kotra and Jhadol Region are tribal dominated and known for illiteracy and underdevelopment. The people living in these areas don't have access to education and other facilities. Majority of the tribal people living in this area are dependent on agriculture as a source of livelihood. Local communities (Bheels and Meena) depend a great deal on the available natural resource base for their food and livelihood security. When this base gets depleted to such an extent that it is unable to support the population, people are forced to migrate in search of employment.

So, In order to empower the people living in this area proper emphasis should be given to upgrade the technologies used in agriculture. The paper reveals the benefits of using Sloping Land Agriculture Technology. Following are some of the benefits recorded in the case study due to application of these technologies:

- Moisture retention & ground water level increases
- Reduction in water velocity
- Reduction in soil erosion thus protects soil fertility.
- Increase in productivity.
- Increase in drinking water for people living in nearby villages.
- Significant hike in income level of farm owners.

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