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RIVERBED FARMING

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ABSTRACT

Seasonally, dry riverbeds are an under-utilized resource that can be used for sustainable vegetable production. In many countries, cucurbitaceous vegetables are extensively being grown in riverbeds (called diara land). Riverbed cultivation or diara cultivation is very old practice of growing vegetables on the bank or basin of river after when flood level receded. These diara lands are formed and subjected to alluvion and diluvion action of perennial Himalayan Rivers and due to inundation caused by swollen rivers during South- West monsoon. This system is unconnected with any other crop rotation and cucurbits are specially adapted to this system of growing due to their long tap root system. It can be treated as a kind of vegetables forcing where in the cucurbits are grown under sub- normal conditions, literally on sand, during winter months from November- February, especially in North and North- Western India. Riverbed farming can be used to increase household income and to improve the food security of landless and land-poor households of India.

Introduction

Riverbed farming was selected as an entry point to promote inclusive economic growth for the benefit of the landless people. Growing cucurbitaceous vegetables and fruits on riverbeds or river basins constitute a distinct type of farming. Usually these lands are available only for a short period, and landless, small and marginal farmers cultivate on these lands the seasonal vegetables and fruits, for marketing. Riverbed cultivation is adopted in cucurbits. The diara land, broadly classified under active flood plains, features a riverine landscape with unstable land surfaces, subject annually to flooding, erosion, and redeposition is situated between the natural levees. The fresh silt and clay deposits received every year during rainy season make this land suitable for growing cucurbitaceous crops. The cropping pattern in these areas is based on rain fed subsistence farming.

Advantages of Riverbed cultivation

There are several advantages of river bed cultivation, which includes:

- high net return per unit area,
- early and high yield,
- ease in irrigation,
- low cost,
- less mineral requirement due to high fertility,
- limited weed growth,
- easy in control of pest and disease by cultural, means,
- low cost labour facilities.

Scope and Importance

It can be treated as a kind of vegetable forcing wherein the cucurbits are grown under sub-normal conditions practically on sands. In U.P. these are grown on low priced sandy soils along the beds of the rivers. In Rajasthan these are cultivated on bare, active sand-dunes in sandy regions of Bikaner and other tracts of Rajasthan. Some of the cucurbits *viz.*, melon, water melon, khira, etc. are quite common and usually raised in the river basins during summer which is having a good market for small and marginal farmers.

Improved varieties for Riverbed cultivation

Diara land cultivation continues to be carried out with the traditional varieties and manner. Many improved varieties of bottle gourd, bitter gourd, cucumber, luffa etc. have been developed by various research institutes but they yet to be evaluated and adopted in diara lands.

Cropping Pattern

Cropping pattern usually practiced in riverbeds are Bottle gourd, Bitter gourd, Cucumber and Sponge gourd in North India, Ridge gourd in Rajasthan, M.P. and U.P. and Pointed gourd in Bihar.

Riverbed / Diara Soils

A well drained soil of loamy type is preferred for cucurbits. A long tap root system is adapted to the growth of cucurbits in river-beds. The soils should not crack in summer, and should not be water-logged in rainy season. It is also necessary that soils should be fertile and provided with adequate organic matter.

All the cucurbits are sensitive to acid soils. Below pH of 5.5 no cucurbits can be successfully grown and most of the cucurbits prefer a soil pH between 6.0 to 7.0. Musk melon is slightly tolerant to soil acidity, while other cucurbits prefer intermediate or normal pH. Similarly alkaline soils with heavy salt deposition are unsuitable for cucurbits and water melon is the only cucurbit which is slightly tolerant to salts.

Soil moisture is important for rapid growth and it should be at least 10% to 15% above the wilting point. Rainy season cucurbits are mostly unirrigated. Depth of the soil is also an important consideration in case of perennial cucurbits.

Riverbed / Diara Systems

Seasonally dry riverbeds are an under-utilized resource that can be used for sustainable vegetable production. In the Indian subcontinent, climate change-induced floods and the encroachment of riverbeds are silting over arable land and increasing the area of sandy riverbeds. Growing of cucurbits in river-beds or river-basin constitute a distinct type of farming. The system consists of digging trenches at 2-3 meter spacing or pits at 4 meters apart after the cessation of south-west monsoon in late October. Most of the cucurbits are sown in November and December. Before sowing, the trenches are manured with FYM or any other organic decomposed waste or oil cakes.

Riverbed plots are chosen by farmers, with plots perpendicular to the river's flow. This allows every farmer equal access to different types of soil needed for the different crops. Short-rooted crops like cucumber and bitter gourd are planted close to the water; long-rooted bottle gourds, pumpkins, and watermelon are planted further in the back. To prevent crop damage by thieves or wild animals, a fence is erected around the perimeter of the plots. A shelter is built in the vicinity to serve as protection from the sun during the day, and to function as a look-out during the night.

Farmers choose either the pit or the ditch system when planting, depending on personal preferences and labor availability. For the pit system, pits are dug 1 m deep and 0.5 m apart and planted with multiple seeds, the weakest of which are thinned out. In the ditch system, a trench 1 m deep is dug along the row, with 2 m (cucumber, bitter gourd) to 3 m (watermelon, bottle gourd, pumpkin) space between rows. Seeds are planted spaced 0.5 m (cucumber, bitter gourd) to 1 m (watermelon, bottle gourd, pumpkin) apart in the ditch.

Irrigations necessary for seedlings every 2 to 3 days if the soil does not contain enough moisture. However, if plants have groundwater within 1 m depth, no further irrigation is necessary after this. Mulching is used to conserve soil moisture, support branch distribution, protect from wind damage, and minimize weed growth. No tillage is necessary. After harvest, crops are transported to local market centers for sale.

When the vines grow, they are spread over the sand and before that trenches are leveled up and the stubbles of grass are spread over the sand on the interspaces between the rows of the plants.

Conclusion

Riverbed farming may increase farmers' vulnerability to environmental shocks because riverbed cultivation is a low-environmental-impact, easy-to-learn, cost-effective technology allowing landless households to produce on unused marginal lands. In the medium and long term, it increases households' resilience and creates rural employment opportunities. A large number of problems are faced by the growers, starting from the uncertainty of availability, of land on long term basis, sometimes river-course shifting fertility status, leaching, irrigation etc. besides the good quality of seed availability.

In spite of these problems a large number of growers are cultivating cucurbits in the river-bed areas, especially in summer producing large quantities of musk melon, water melon, cucumber etc. This type of cultivation is best suited for the small farmers and marginal farmers, who can work themselves along with their families in the fields, producing a large number of cucurbits and other vegetables economically. By utilizing an under-exploited resource and enhancing small holders' productive skills on marginal soils, riverbed farming increases marginal farmers' options for sustainably coping with the effects of environmental shocks like floods.

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