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## Riverbed farming: Means of livelihood

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**Abstract**

Human population in India has been increasing tremendously and on other side land availability per capita (0.12 ha) for agriculture decreases. Under this situation, it becomes quite difficult for the poor farmers to sustain their livelihood. Riverbed farming or use of waste land is one of the best options for farmers to sustain their livelihood. Riverbed farming can be used to increase household income and improve the food security and living standard of landless and land-poor households of India. Unutilized dry riverbeds are resource that can be used for sustainable vegetable production. In many countries, cucurbitaceous vegetables are extensively being grown in riverbeds. Riverbed cultivation is very old practice of growing vegetables on the bank or basin of river after flood level recedes. This system is particularly useful for growing vegetables like cucurbits, tomato, okra, cowpea because of their long tap root system. In Middle Gujarat, Orsang River belt in tribal area of Chhota Udepur District is one of the best examples for riverbed Farming. Farmers connected with Orsang River are very good in Riverbed Farming which is generally done during November to February. In riverbed farming, pits or ditch system is adopted depending upon crop, labour availability and farmer's own choice. Today, in the era of climate change "Riverbed farming" is the best option for farmers as it offers the opportunity to use natural resources and sustain the farming even under the situation of environmental shocks like floods. Our Prime Minister dreams of doubling the income of farmers for fulfillment of which Riverbed farming is one of the best tools as it minimizes the cost of cultivation like fertilizer, irrigation, tillage, weeding operation etc.

**Keywords:** cucurbits, vegetables, riverbed farming, orsang river

**Introduction**

In India, River is piously regarded as Mother as it is of utmost importance for life of human being as well as all other living organisms. Therefore in Sanskrit it is quoted that "परोपकाराय वहन्ति नद्यः". All the civilizations from ancient time in the world were grown on bank of the rivers. Human population in India has been increasing tremendously and on other side land availability per capita for agriculture decreases (World Bank, 2015). Under this situation, it becomes quite difficult for the poor farmers to sustain their livelihood. Riverbed farming or use of waste land is one of the best options for farmers to sustain their livelihood. Riverbed farming is totally dependent upon rainfall and conserved moisture. Vegetables like *cucurbitaceous* family like, cucurbit, watermelon, musk melon, khira, bottle guard, ridge guard, bitter guard and tomato, egg plant, okra, cowpea and potato are most suitable in Riverbed farming. The soil and moisture are available for short time for farming, so landless farmers use the conserved moisture and get maximum output in short period of time. In Riverbed farming *cucurbitaceous* crops are most common among farmers. In monsoon, lots of organic matter with soil gets deposited because of flood in the river bed area and then on the surface layer sand deposition occurs. The cropping pattern in these areas is based on rain fed subsistence farming (Patel, 2016). The moisture is conserved in dipper layer of river after monsoon which is duly utilized in Riverbed farming during winter and summer for suitable crops. In Gujarat, different areas are known for Riverbed farming; however Chhota Udepur district of middle Gujarat is well known for riverbed farming of Musk melon and Water melon in Orsang River. Farmers from this area are hard workers and produce best quality vegetables from Riverbed and get maximum profit from that. Today, in the era of climate change "Riverbed farming" is the best option for farmers as it offers the opportunity to use natural resources and sustain the farming even under the situation of environmental shocks like floods.

**Advantages and Difficulties of Riverbed cultivation**

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

- High net return per unit area,
- Early and high yield in respect to quality and quantity,
- Ease in irrigation,
- Low cost,
- Less fertilizer requirement due to high fertility,
- Limited weed growth,
- Ease in control of pest and disease.

There are several difficulties of river bed cultivation, which include:

- Unavailability of land for long time,
- Soil erosion due to flood in river,
- Irrigation facility (because in summer conserved moisture is not enough to provide sufficient water to the plant),
- Unavailability of quality seed,
- Animal damage and
- Market price etc.

### Scope and Importance

For cucurbit and other vegetables, water requirement is generally high, because of which they are not suitable where irrigation facility is not available. But in riverbed farming with use of conserved moisture, landless, small and marginal farmers get maximum output by vegetables cultivation during winter and summer. In India, Northern states like U.P., Rajasthan and M.P. are popular since long. In summer, due to high market value of vegetables, farmers get good income. Moreover, produce from Riverbed farming is also excellent in terms of quality and taste which make them highly demanded among the consumers.

### Improved varieties for Riverbed cultivation

Riverbed cultivation continues to be carried out with the traditional varieties and manner. But now-a-days farmers use popular varieties for different crops and get good yield. Many improved varieties of vegetables have been developed by various research institutes but there is no any particular variety developed for riverbed farming. However it is the need for the farmers.

### Cropping System

Commonly, cropping pattern usually practiced in riverbeds are Bottle gourd, Bitter gourd, Cucumber and Sponge gourd in North India, Ridge gourd in Rajasthan, M.P., U.P. and Pointed gourd in Bihar and water melon, musk melon, tomato, potato, okra, egg plant, cucurbit etc. in Gujarat.

### Riverbed Soils

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

### Methodology

Commonly, after withdrawal of monsoon mostly all rivers get

dried and on upper layer only dry sand is seen; however water present in dipper layer where organic matter and soil are present, continuously flows. This type of area is best suited for riverbed farming. In India, due to heavy rainfall lots of fertile soil is eroded during monsoon and lots of fertile soil and organic matter get deposited in rivers. Riverbed farming is different type of farming. In this system, after withdrawal of monsoon in the month of October, pits or dip channels are prepared as per spacing required for crop. Sowing time for all cucurbitaceous crop is in the month of November-December. Before sowing, all the pits or ditches are fertilized with well decomposed FYM or manure or Bio fertilizer and required amount of Phosphorus fertilizer. Riverbed plots are chosen by farmers, with plots perpendicular to the river's flow.

For riverbed farming, farmers prefer different types of soil according to crop. Deep rooted crops like water melon, bottle guard and pumpkin are cultivated away from flowing water as these crops can absorb water and nutrients from deeper layer of riverbed, while crops like cucurbit are cultivated near flowing as they are shallow rooted. Fencing is necessary for protecting the crops from wild animals and reducing the damage.

In riverbed farming, pit or ditch system is adopted depending upon crop, labour availability and farmer's own choice. For the pit system, pits are prepared as per the crop, generally of 1 ft x 1 ft size and planted with multiple seeds, the weakest of which are thinned out after germination. In the ditch system, a trench is dug along the row as per moisture availability, 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 are necessary for seedlings every 2 to 3 days for proper germination if the soil does not contain enough moisture. However, if plants have groundwater within 1 m depth, no further irrigation is required. 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. Mulching is used to conserve soil moisture, support branch distribution, protect from wind damage, and minimize weed growth. No tillage is necessary. For the management of pests and diseases, necessary protection measure should be taken. After harvest, crops are transported to local market centers for sale or direct selling of the produce from the field as per the demand. Farmers from Chhota Udepur District sell their produce like water melon and musk melon directly from field and get more profit.





### Conclusion

Riverbed farming is an excellent opportunity for resource poor small, marginal or landless farmers to sustain their livelihood, get good profit with minimum cost and make themselves self-reliant through employment generation. The farmers of Chhota Udepur district beautifully grow cucurbitaceous crop like cucurbit, water melon, musk melon, khira, bottle guard and sponge guard and other crops like tomato, potato, okra, egg plant etc. in riverbed. Our Prime Minister dreams of doubling the income of farmers for fulfillment of which Riverbed farming is one of the best tools as it minimizes the cost of cultivation like fertilizer, irrigation, tillage, weeding operation etc..

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