

## Forcing and protected cultivation of vegetable crops in rivers beds under climate change

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### ABSTRACT

The field study was laid out during 2008 and 2009 in the catchments area of Ganga river at Kannauj and left bank of Ganga river at Unnao, left bank of Yamuna river at Kanpur, right bank of Betawa river at Hamirpur and Lalitpur, left bank of Betawa river at Jhansi, right bank of Yamuna river at Kalpi, Isan river at Mainpuri, Chambal river at Agra, Kein river at Banda and Mandakini at Chitrakoot. The main objective of the study was to utilize the exposed rivers beds from October to on set of monsoon for cultivation of vegetables with recharged ground water of rivers beds. The fruits of vegetables reaped by 328 q/ha of pumpkin, 238 q/ha of bottle gourd, 142 q/ha of sponge gourd, 205 q/ha of bitter gourd, 105 q/ha of long melon, 190 q/ha of snap melon, 330 q/ha of water melon and 245 q/ha of muskmelon. Potato gave tubers yield by 295 q/ha, while tomato fruits harvested as 310 q/ha. The green foliage and immature bulbs of onion reaped by 147q/ha for green vegetable. The fresh roots of radish harvested as 267 q/ha.

**Key words :** Catchments, Forcing Vegetables, river bed, Lug-tug, Main assembly, Trendle vegetables

### INTRODUCTION

The rivers expose their beds during winter months. The surface water of rivers beds wrests in the main stream, where its flow is continuous or says in the main natural drainage system. Slowly and slowly the ground water of these exposed rivers beds also trail in the main assembly of rivers with lug-tug system of *in situ* moisture loss. This down word movement of rivers beds ground water make dry to up and lower surface of exposed rivers beds, result in beds unemployed from winter season to on set of rains. Although these exposed beds are unproductive due to sand and mixture of sand and stone nodules texture and non soil microbial activities. However, these exposed river beds may be utilized with manipulation in conservation agronomical practices for obtaining the bumper yields of forcing vegetables and other under the adverse situation of climate change. The cultivation of forcing vegetables with exploitation of rivers beds ground water and soil management through activation of soil microbes under climate change is the subject matter of this manuscript.

### MATERIALS AND METHODS

The field trail was conducted during 2008 and 2009 in the catchments area of Ganga river at Kannauj and left bank of Ganga river at Unnao, left bank of Yamuna river at Kanpur, right bank of Betawa river at Hamirpur and Lalitpur, left bank of Betawa river at Jhansi, right bank of Yamuna river at Kalpi (Jalaun), Isan river at Mainpuri, Chambal river at Agra, Kein river at Banda and Mandakini river at Chitrakoot under FPARP on Water/Water Harvesting scheme funded by Ministry of Water

Resources of Govt. of India. The exposed beds of above rivers catchments area were selected for raising of pumpkin, bottle ground, sponge gourd, bitter gourd, long melon, water melon, musk melon, snap melon, tomato, potato, onion and radish crops. The five farmers under each crop were selected for execution of the programme. The soil of Ganga, Ison, and Chambal was sand while rivers flow in Bundelkhand of U.P. *i.e.* Yamuna, Betawa, Kein and Mandakini have coarse gravelly soil with mixture of fine and coarse sand, very low in fertility and very less soil microbial activities. The trendle crops *i.e.* pumpkin, bottle gourd, sponge gourd, bitter gourd, long melon, snap melon, water melon and musk melon were raised in trenches. The trenches 60 cm wide and 10 cm deep were prepared at 90 cm distance and in these trenches hills were made at 90 cm apart. At each hill 5 kg of FYM, 100 g of caster cake and 10 g of neem leaf powder was applied, then 4-5 sprouted seeds of each vegetable were put in each hill at 4-5 cm depth. At quick growth stage of these vegetables the well rotted FYM or compost @ 10 kg/hill raked in to the sand and gravelly sand soil with the help of spade. Potato tubers were planted on ridges, prepared at 45 cm apart. The distance between plant to plant was kept 15-20 cm. A mixture of 200 q FYM+ 75 kg N+ 100 kg P<sub>2</sub>O<sub>5</sub> + 100 kg K<sub>2</sub>O +100 kg neem leaf powder + 100 kg caster cake/ha was applied to potato below the ridges as basal application and 75 kg N top dressed after irrigation at complete sprouting of tubers and earthing. Tomato crop fertilized @ 0.5 kg FYM + 2.5 g urea+3 g DAP+3 g MOP + 2 g neem leaf powder + 2 g caster cake/pit as basal and 2.5 g urea/pit top dressed after proper establishment of seedlings. The 150 q FYM+ 50 kg N+ 50 kg P<sub>2</sub>O<sub>5</sub> + 50 kg K<sub>2</sub>O + 100 kg neem leaf

powder + 100 kg castor cake/ ha was given to radish as basal in farrows and 50 kg N/ha top dressed at root thickness stage. Similarly, the onion crop fertilized with 250 q FYM + 60 kg N + 80 kg P<sub>2</sub>O<sub>5</sub> + 80 kg K<sub>2</sub>O + 100 kg neem leaf powder + 100 kg castor cake/ha and raked in to the soil at the time of field preparation and remaining 60 kg N/ha top dressed at bulbs formation stage. Cvs. Pusa Vikash of pumpkin, Kalyanpur green long of bottle gourd, Pusa Supriya of sponge gourd, Arka Shital of long melon, Madhuri of water melon, Green madhu of muskmelon, Kalyanpur Sona of bitter gourd, local of snap melon, Arka Kirtiman of onion, Kufri Satlaz of potato, Pusa Hybrid -2 of tomato and Pusa Himani of radish were sown/ transplanted. The trendle vegetable crops were sown between mid December to mid January . Potato and tomato were planted in mid November. The seedling of onion transplanted in the first week of January, while sowing of radish started from mid October and continued upto March, depended upon exposure of rivers beds. The crops were watered by a pitcher. Later on the crops irrigated with recharged ground water, harvested in temporary *Kachacha* open dug wells as and when required. The young plants of trendle crops were protected by Sarkanda covering and later on these were spread over the sand surface for trailing of vines. The other agronomical practices were followed as per recommendations. The fruits of green edible vegetables, onion bulbs and roots of radish plucked at green stage for ready market, while water melon, musk melon, potato and tomato harvested after ripening.

## RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized below :

The fruits of vegetables reaped by 328 q/ha of pumpkin, 238q/ha of bottle gourd, 142 q/ha of sponge gourd, 205 q/ha of bitter gourd, 105 q/ha of long melon, 190 q/ha of snap melon, 330 q/ha of water melon and 245 q/ha of muskmelon. The tubers of potato were dug out for ready market and fresh tubers yield recorded by 295 q/ha. Tomato gave fruits yield as 310 q/ha. The onion crop was harvested for green vegetable. The immature bulbs and green foliage of onion gave yield by 147 q/ha.

Sr. No.	Crop	Yield (q/ha)
1.	Pumpkin	328.00
2.	Bottle gourd	238.00
3.	Sponge gourd	142.00
4.	Bitter gourd	205.00
5.	Long melon	105.00
6.	Snap melon	190.00
7.	Water melon	330.00
8.	Musk melon	245.00
9.	Potato	295.00
10.	Tomato	310.00
11.	Onion (green vegetable )	147.00
12.	Radish	267.00

The roots of radish harvested at soft edible stage, yielded as 267 q/ha (Table 1). The good yields of forcing vegetables in rivers beds were harvested due to better nutrients management, use of tougher high yielding varieties and maintaining of proper moisture with life saving irrigation by recharged water in *Kachichi Kueeyans*. These findings are concordance with the results of Singh and Singh (2008) and Singh and Singh (2009).

## REFERENCES

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