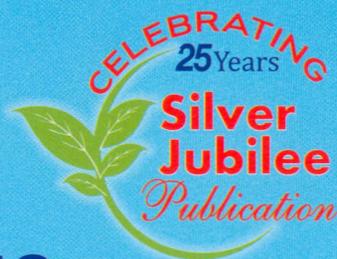
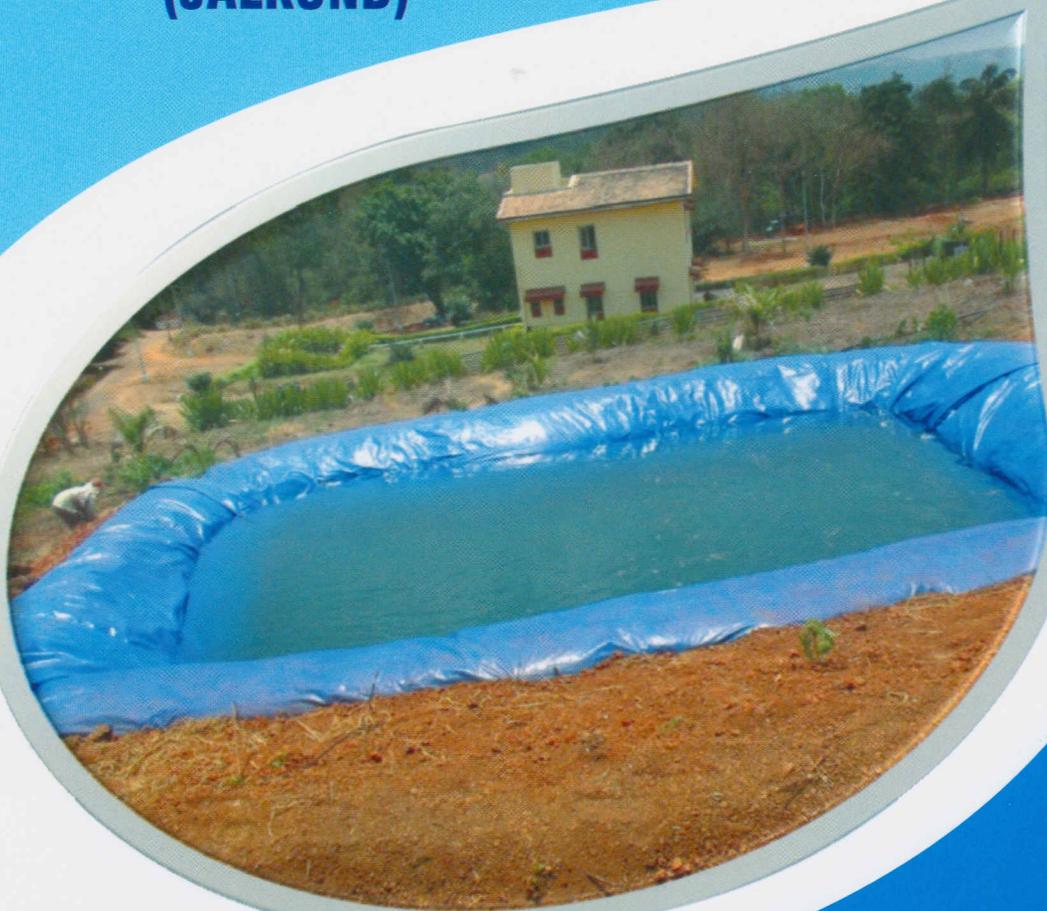


Technical Bulletin No.32



# LOW COST RAIN WATER HARVESTING TECHNOLOGY (JALKUND)



**ICAR Research Complex for Goa**

(Indian Council of Agricultural Research)

Old Goa - 403 402, Goa, India.



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RAIN WATER HARVESTING  
TECHNOLOGY  
(JALKUND)**



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# PREFACE

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Water, the critical input in agriculture production is decreasing in its availability over the years. Any effort made to conserve and re-utilise the rain water is a boon in this direction.

Direct water catch pits (Julkunds) are simple and easy to establish and can especially be of much use in the undulating topography for establishment of crops. The experience gained in this regard shows good potential for the benefit of farmers.

We sincerely acknowledge the research efforts carried out earlier by Dr. S. Manivannan, Senior Scientist (Soil and water conservation engineering) as well as the visionaries who have contributed in this endeavour.

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# FOREWORD

Water is an important input in agricultural production, the availability of which is shrinking over the years. The West coast region of India with its undulating terrain and laterite soils with high infiltration rate, although receives abundant rainfall, utility of the rain water is only limited. Further, owing to limitations of distribution pattern of rainfall, the crop production faces a serious challenge of water availability especially during March-May periods during each year. In addition, the rainfall is also varying over the years temporally and spatially. As such, harvesting and storing the rain water has become a prime necessity in all the areas.

One of the approaches to conserve this valuable resource is to store on the surface through suitable interventions. This stored water especially in the elevated sloppy areas not only serves as a life saving irrigation but also will favour the better establishment of orchards with better availability of moisture during establishment phases of perennial/horticultural species.

I am happy to note that ICAR Research Complex for Goa made efforts to standardise the technology for "LOW COST RAIN WATER HARVESTING (JALKUND)" through a series of trials based on the practical feasibility in the region and bringing out this publication especially on the eve of Silver Jubilee celebrations of the establishment of the Institute. We are grateful to Indian Council of Agricultural Research, New Delhi for financing the Project.

I will also appreciate the efforts made by the scientists to popularise this technology for better livelihood security of small and marginal farmers of the region.

This compilation will serve as a practical guide for establishing rain water harvesting structures in the region as well as to provide relevant information to the researchers, extension workers and to the farming community.

**Narendra Pratap Singh**

13<sup>th</sup> August, 2013

**W**ater is one of the most important factors in agriculture for successful crop production. The West coast region of India including Goa with undulating terrain receives abundant rainfall upto 3000-3200 mm in a year but the distribution of it is limited only to South West monsoon period ie from June to September. As such, practically there is no moisture in soils of the region for more than eight months of the year. Thus, there is a greater need for storing of this abundant rainfall

received in the region for profitable crop production. Unavailability of adequate amount of water during the dry season becomes a serious problem to the farmers for successful farming. This problem can be minimized by rain water harvesting and its judicious use in agriculture. Direct rainfall collection through water catch pits (*Jalkunds*) can be highly beneficial to the farmers for providing irrigation to the crops under moisture scarcity conditions during the dry season.

### **Steps involved in construction of a *Jalkund*:**



- Dugout a pit of desired dimensions as required according to the area which needs be irrigated.



- Remove stones and other material with sharp edges from the bottom and sides of the pond.



- Provide proper smoothening to the inner walls, including the bottom of *Jalkund* by plastering a mixture of clay soil and cow dung in the ratio of 5:1.



- Spray insecticide (Chlorpyriphos 35 EC@ 2ml/litre of water) on the surface of the inner walls and the bottom of *Jalkund*.



- Place 10-15cm thick layer of paddy straw along the sides and bottom of the *Jalkund* to ensure a smooth surface.



- Dugout a trench of size 30 cm width and 30 cm depth along the sides leaving a space of 30 cm from the edge of the *Jalkund*.



- Line the sides and bottom of *Jalkund* with 250 GSM thickness Silpaulin polyfilm.



- Fix Silpaulin polyfilm in the trench dugout around the *Jalkund* and cover with soil to ensure that the sheet does not get displaced.

- Make a drainage channel preferably of 30cm width and 30cm depth across the slope on upper side of the *Jalkund* to ensure that muddy water will not enter in and similarly make an outlet channel on lower side of the *Jalkund* for safer drainage of excess water:
- Pour about 100 ml of Neem oil into the *Jalkund* every year after the end of rainy season to avoid the evaporation losses and to keep the animals away through smell of oil. As an alternative option for reduction of evaporation, locally available coconut leaves can be used to cover the *Jalkund*.
- Fencing of 1 to 1.5 m height may also be provided all around the *Jalkund* to prevent its damage from stray animals.

### **Benefits of *Jalkund* :**

- Rain water can be stored directly in the *Jalkunds* during the rainy season which can be utilized to provide protective irrigation to the crops for successful cultivation. Otherwise, it may cause soil erosion and nutrient loss through runoff.
- Stored water can also be utilized for the rearing of Livestock, Piggery, Poultry and Duckery.
- Fish rearing can also be taken in the harvested water.
- Major crops which can be grown through utilizing *Jalkund* harvested water include:
  - Vegetable crops:** Brinjal, Chilly, Tomato, Radish, Amaranthus, Coriander, Cowpea, etc.
  - Horticultural crops:** Cashew, Coconut, Mango, etc.
  - Flower crops:** Jasmine, etc.
- Under Protected cultivation:**
  - Vegetables:** Cucumber, Chilly, etc.
  - Flower:** Gladiolus, Liliium, etc.

## Specifications of a *Jalkund* for water harvesting capacity of 72,000 litres

Dimension of <i>Jalkund</i> (L X W X D)	8.0 m x 6.0 m x 1.5 m
Dimension of 250 GSM Silpaulin polyfilm sheet (L X W)	13 m x 11m
Provision for outlet	Make a outlet in sloping side of the <i>Jalkund</i>
Provision for excess water drainage	Make an excess water drainage channel across the slope on upper side of the <i>Jalkund</i>
Water harvesting capacity	72,000 litres
Approximate area which can be irrigated through drip irrigation	0.15-0.20ha
Approximate cost	Rs. 25,000-30,000
Approximate life of the Silpaulin Polyfilm	10 Years

### Major cost involved in *Jalkund*:

The cost of making a *Jalkund* depends on its size and input rates in the market. The main costs involved in construction of a *Jalkund* are digging expenses and cost of silpaulin polifilm sheet. Digging cost depends on site topography, soil type and prevailing labour rates in the region.

The use of insecticide cost is very nominal and fencing can be made by using locally available bamboos or cheap

wood of the farm which does not require any extra cost.

### Conclusion:

Although larger size *Jalkunds* can be also constructed as per the area need to be irrigated but smaller size *Jalkunds* require low cost and are easy in maintenance. As such, smaller size *Jalkunds* are recommended which are more affordable and useful to the small and marginal category of farmers.



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