

Jalkund: Low-Cost Water Harvesting Structure for Sustainable Livelihood in Rainfed Agroecosystem of the Chandel district of Manipur, India

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The district of Chandel is neighboured by Myanmar on the south, Ukhrul district on the east, Churachandpur district on the south and west, and Thoubal district on the north. It is located at a distance of about 64 km from Imphal, the state capital. The total geographical area of the district is 3,313 square km and it lies between 23.49 degree and 24.28-degree north latitude and 94.09 degree to 94.31-degree east longitude in the south- eastern part of the state of Manipur.

The district is characterized by varying topology that is largely affected by high seepage flow and flash runoff. The dual yet contrasting effect of water in the form of heavy rainfall during monsoon and water scarcity during post monsoon is characteristically severe in this region. The existing typical undulated terrain and dual effects of water are the main limiting constraints in storage as well as availability of runoff water and its later use for irrigation purposes in the district. Of late, there has been an increasing interest in low-cost water harvesting and micro-irrigation system for small scale farming practices.

The age-old traditional farm ponds practiced by the local farmers are vulnerably susceptible to potential losses like infiltration, percolation, seepage flow and evaporation to a great extent. And huge financial requirement for construction/ adoption of concrete pond and optimal irrigation systems makes it almost beyond their reach for the marginal farmers to adopt efficient agricultural techniques/farming systems. Hence, it is essential to identify an economical approach to agricultural techniques so as to uplift the scope for adoption of advanced small scale agricultural techniques/ farming systems for the local tribal farmers of Chandel.

With a purpose to incorporate integrated ways of farming system coupling rainwater harvesting technique, *Jalkund* and micro-irrigation system using gravity system has been put up to demonstrate in Chandel District of Manipur. The use and applicability

of the proposed approach in the tough dry terrain of Chandel District of Manipur was assessed for its effectiveness and farmers' satisfaction level.



It was found that adoption of *Jalkund* for harvesting rainwater and its judicious use in agricultural practices can greatly benefit the farmers of NEH region of India. The motive was to demonstrate an economical approach to small scale integrated farming system using *Jalkund* and micro-irrigation system as to elevate the socio-economic status of the tribal farming community.

Low-cost rainwater harvesting structure, *Jalkund*: *Jalkund*, an economical rainwater harvesting structure restricts the potential losses like infiltration, percolation, seepage flow and evaporation to great extent. (Saha *et al.*, 2007) ICAR, Barapani, Meghalaya has successfully developed *Jalkund* integrating lining of the inner wall and bed of the pond using Low Density Polyethylene (LDPE) of 250- or 500-micron films. The lining film is a revolutionary concept in water management which dramatically restricts the seepage losses at a reasonable cost. Installation of *Jalkund* involves excavation of kund (Pond), for a total capacity of 30,000 liters with a dimension of 5m x 4 m x 1.5 m. Once excavation is done plastering of the inner walls of the pond with a mixture of clay and cow dung in the ratio of 5:1 followed by a 3 – 5 cm thick cushioning with dry pine leaf or thatch grass @ 2 to 3 and ultimately laying down of lining material (LDPE

black agri-film of 250 or 500 micron). The collected water can be covered with locally available materials like bamboo, grasses, etc. as to avoid the evaporation loss of water particularly during off season (November to March). The adoption and installation of *Jalkund* is simple.



With proper lining and roofing, the potential water losses may be restricted allowing storing of water for later uses. Harvesting of rainwater using *Jalkund* and integration of micro-irrigation system for irrigating the farmer's farm may uplift the applicability of small-scale integrated farming system.

Methodologies

***Jalkund* construction mechanism**

- Excavation of the pit of the 7.5 x 4.5 x 1.2 m on selected site (preferably at hill top/uplands) before the onset of monsoon.
- The bed and sides of the *kund* should be levelled by removing rocks, stones or other projections, which otherwise might damage the lining material.
- The inner walls, including the bottom of the *kund*, to be properly smoothened by plastering with a mixture of clay and cow dung in the ratio of 5 : 1
- After clay-plastering, about 3–5 cm thick cushioning should be done with locally and easily available dry pine leaf (@ 2–3 kg/sq. m) on the walls and bottom, to avoid any kind of damage to the lining material from any sharp or conical gravel, etc.
- This should be followed by laying down of 250 μ LDPE black agri-film or Silpauline sheet. The agri-film

sheet should be laid down in the *kund* in such a way that it touches the bottom and walls loosely and uniformly, and stretches out to a width of about 50 cm all around the length and width of the *kund*. A 25 x 25 cm trench should be dug out all around the *kund* and



25 cm outer edge of agri-film may be buried in the soil, so that the film is tightly bound from all around. At the same time, side channels all along the periphery of the *kund*, helps to divert the surface run-off and drain out excess rainwater flow. This is to minimize siltation effect in the *kund* by allowing only direct precipitation. Silpaulin sheet 250 GSM can be also used for longer duration in place of LDPE black agri-film.

e) *Jalkund* is to be covered with thatch (5-8cm thick) made of locally available bamboo and grass. Neem oil (10ml/sq.m.) is also advocated to reduce evaporation in off season.

Outcome

Traditionally the farmers of the district practiced mono cropping due to lack of water in rabi season. The sustainable water availability round the year through the Jal Kund will certainly enhance the income of the farmers crops like tomato, king chilli, cabbage, etc. and also from the extra income expected from rearing of fish and ducks.

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