WATER HARVESTING – THE VARANASHI STORY

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INTRODUCTION

Varanashi Farms (VF), a 32 ha organic farm (Moorthy and Moorthy, 2002) is located in coastal Karnataka, India. It has multiple cropping system; growing arecanut, cocoa, coconut, vanilla, black pepper, rice, cashewnut, banana, tea and vegetable crops. This locality receives fairly heavy rainfall (average 2,850 mm). But due to uncertain pre-monsoon rains, undulating landscape and laterite soil, the area faces water stress during summer. During last 30 years increased area under arecanut, high irrigation demanding cash crop has further decreased the water table and aggravated the shortage problem. This paper discusses how this problem was solved by systematic soil and water conservation methods including a few innovations.

METHODOLOGY

GROWING FOREST

- Since 12 years, VF has gone organic. But there is no cutting of trees for green manuring. Forest growth is encouraged in 30% of the land, especially at up lands by retaining natural flora as well as gap filling with *Casurina, Acacia, Mangeum,* teak, cashewnut etc. All these trees have contributed to the percolation and conservation of water. Agro-industrial wastes such as coir pith, coffee husks, poultry manure are used as raw material for preparing compost by VRF Method, and applied to the field.

- **CATCH PITS IN TREE BASIN:** On the upper reaches near the basin of trees planted in the slopes, catch pits (1 m x 0.3 m x 0.3 m) have been dug and soil is leveled. This common practice helps collection and percolation of water into deeper layers.

WATER HARVESTING STRUCTURES AND METHODS

- **CHECK DAMS:** With the available stones nearby, small check dams have been erected against the rainwater flowing through the natural channels. This enables the water to partly percolate into the lower layers.

Figure 1: Rain water flowing out after filling check dam

- **PROVIDING CURVED PATH TO THE FLOWING WATER:** Instead of allowing water flow straight along the slope, it has been made to flow in zigzag way by constructing channels across the slope. It not only slows down the velocity but also allows water to move downward and get stored in the soil.

- **WATER PERCOLATION IN BOUNDARY TRENCHES:** Check dams are built at regular intervals in the demarcation - cum - cattle - barrier trench dug all along the boundary. This is an easy way to collect water for percolation.

- **WATER PERCOLATION IN ROAD DRAINS:** Blocks are built across road drains, so that water fills and over-flows. This is another cheap method of water conservation.

- **PERCOLATION POND:** Just above VF, there is a hillock. A pond (30 m x 5 m x 4 m) has been dug with machine below the hill but above the VF. Water, after filling in this pond, over-flows only for a few days in the rainy season. Most of the water percolates into the soil.

- **'MADAKA' IN THE HIGHER REACHES OF TANK:** A mini-tank locally called 'Madaka' is erected above a regular irrigation tank for water percolation. Initially, the water accumulates in the former and then, in the regular tank in the rainy period. Only when there is heavy rains, excess water flows out.

- **CLOSING THE OUTLET OF THE TANK IN RAINY SEASON:** Normally in the rainy season, the outlets of the irrigation tank are kept open. But in VF, such outlets in the tanks are closed, allowing the water to accumulate and then only over-flow. Rain water fills into the catch pits and then flows into the drains, which again gets accumulated in the check dams, then in the 'Madaka' and ultimately flows to the irrigation tanks. Thus, the entry of silt is minimized. As water accumulates in the tank for a long period, the water table in the surrounding areas also rises and so, there is increased water availability in summer.

- **MINI COLLECTION TANK FOR THE WATER FLOWING FROM THE IRRIGATION TANK:** Even after rain cease, the water springs out for considerable time at the lower levels of the tanks. This water is collected in a mini-tank, situated lower to the tank. Water is available in the mini tanks for 4-8 weeks in the beginning of summer.

- **PERCOLATION PIT NEAR THE WELL:** In the industrial plot of Varanashi's, a percolation pit with 20,000 litre capacity has been dug in the upper reaches of a 17 m deep well. Further, the water from roof has been diverted to flow in a zigzag manner so as to facilitate percolation to the lower soil layers and then allowing the excess to move out.

- **RECHARGING THE BORE-WELL:** Two bore-wells of VF get directly fed with clean water from the nearby irrigation tanks during rainy season. Such arrangement is also made for an open well used for drinking purposes.

- **SMALL CHECKS IN DRAINAGE CHANNELS:** During the beginning of summer months, small checks are constructed in drainage channels in the arecanut plots in VF at regular intervals for water accumulation and downward percolation and sideways movement which keeps the moisture in the plant basins.

- **'KATTA' ACROSS RIVULET:** In the rivulet near Saravu of VF, a mini temporary barrage called 'katta' is being constructed (9 m long, 3 m height) at the end of rainy season using stones, wild creepers, wooden poles and soil. Thus, water is made to accumulate in the beginning of summer which is pumped out for irrigation.

- **WEED IN SOIL AND WATER CONSERVATION:** At VF weeds are not eradicated; on the other hand they are controlled by slashing once or twice a year. Thus the floor of the mixed plantation has a natural cover preventing soil erosion, moisture loss and also enhancing water percolation.

- **ROOF WATER HARVESTING:** During rainy season, rainwater from the roof of Varanashi industrial shed is collected in a tank and used. Water from occasional summer rains is similarly used.

INNOVATIONS

- **VARANASHI SAND BAG AND PLASTIC BARRAGE:** In the beginning of 2003 summer, a big temporary barrage (35 m length and 3 m height) has been constructed across the Seere river adjoining Varanashi Farm, due to which water got accumulated in 1.5 kilometers of the river. The dam has been constructed using sandbags and tank lining plastic sheet in place of stones and mud, respectively (explained earlier), thereby reducing the cost of construction. Further, the new method also avoids the use of soil (the traditional method) which is washed down while opening the barrage with the onset of rainy season. The barrage enabled to tide over the water scarcity in summer of 2003, also improving the water availability along the banks of the river. The success of this method has prompted farmers around to adopt it. Ten such barrages have been constructed in 2005 summer. In a further improvement the barrage has been built by heaping sand using machine in place of sand bag.

Figure 2 : Varanashi sand bag and plastic barrage

- **USE OF WASTEWATER:** Near the cattle shed in VF, there is a gobar gas unit. In addition to the cow dung, the cowshed washings also flow into the unit. The spent slurry is collected in a 5000-litre tank. The household washing is also diverted into the tank. After dilution, the slurry is pumped and allowed to flow through pipes for irrigating crops. Similarly, washing from the industrial unit is also used for irrigation without any wastage.

- **USE OF SEPTIC TANK WATER**: Varanashi's have standardized use of toilet waste. From toilet the fecal matter flows into a two chambered septic tank. After digestion, the wastewater flows into a third tank. As it gets filled, it is allowed to flow into plant basin through a distribution pipeline. Thus, nutrient-rich water is properly utilised. There are three such units working now. In a latest venture, human waste from toilet, kitchen, bathroom etc. of a commercial complex flow into a large anaerobic digester (modified bio-gas unit). The spent slurry goes into the plant basin as explained earlier. The gas produced is utilised for heating water.

Thus, for rainwater harvesting and conservation, several methods are adopted in VF. Here, during normal rains or drizzling, rain water percolates into the soil column without flowing out. In the beginning of monsoon, it takes about 2-3 weeks of rains for soil percolation and filling all the tanks to the brim and then only excess water flows out of the property. A portion of the conserved water is available in summer, wiping out the water scarcity. Every year, some improvements or additions to this arrangement are being attempted. All these water-harvesting methods also take care of soil conservation.

FACTS AND FIGURES ON WATER CONSERVATION

The following facts and figures illustrate how the water conservation has helped in Varanashi Farms.

- The 36 m deep bore-well below the 'Bittila Kere', initially yielded 2200 liters of water per hour in summer. The same well has yielded 4,900 liters per hour for more than 20 hours per day even during the worst summer of 2003. Another bore-well, 85 m deep yields 9,000 liters per hour.

- After digging bore-well below the "Bittila Kere" tank, the tank got dried up. But now, it irrigates about 1 ha acres in the summer.

- The neighboring arecanut planter, who had desperately dug over 20 bore-wells in his 3 ha plot is happy now with the water level rising up, due to the water conservation measures adopted by VF.

- The 17 m well in the Varanashi industrial plot now yields 3,600 liters of water, against only 1800 liters in the pre-improvement period.

CONCLUSIONS

Make the running water to walk, walking water to crawl and crawling water to stand. These basic principles of water harvesting are well adopted at Varanashi Farms.

Today, at VF, the area under irrigation has doubled. Also, the water is available in plenty. Non drying of irrigation tanks, doubling and continuous water yield in two bore wells, increased yield in open well and improved water sources even to the neighbor are the visible and notable features. The Varanashi success has become an inspiration to other farmers. Many farmers around this village are following the Varanashi model. Besides, these ideas get disseminated through field visits and workshops arranged in VF. Thus, VF has become a Model Farm in this region not only in organic farming but also in water and soil conservation. It is hoped that many more farmers would adopt these techniques leading to a brighter future. "Organic village project", initiated in the village of Varanashi's with the farmers participation is yet another step in achieving the goal.

REFERENCES

Moorthy, V.K. and Moorthy, A.K. (2002). 'Varanashi Farms towards organic and sustainable agriculture'. Cultivating communities, 14th IFOAM Organic World Congress Proceedings. Canadian Organic Growers Inc. 108.

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