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International Commission on Irrigation and Drainage (ICID)

WATSAVE AWARDS 2009

Special Recognition

Summary of Mr. Arvind Narayanrao Nalkande's work

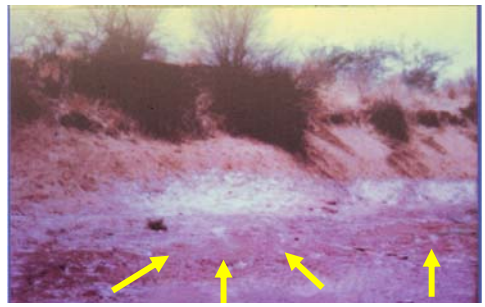
"Rainwater Conservation through Natural Cracks in Deep Black Soils"

(continued on next page)

I. Describe the innovation

The Purna valley of Vidarbha region is an east – west elongated basin with slight convexity to the south. The Purna valley of the Vidarbha region covers parts of Amravati (1738 sq km), Akola (1939 sq km.) and Buldhana (1015 sq km.) districts which extends from 20^0 45^1 to 21^0 15^1 N latitude and 75^0 15^1 to 77^0 45^1 E longitude. This tract spreads on both sides of Purna river , affecting about 892 villages, covering an area about 4692 sq. km. Purna river initiates from southern slopes of Govilgarh hills of Satpuda range which is the principal drain joining to Tapi river. The major tributaries are Pedhi, Sarapi, Shahanur, Katepurna, Uma, Morna, Man, Mas, Nirguna, Nalganga and Dnyanganga. Locally it is said that there are about 360 tributaries joining Purna river.

The soils are formed from basaltic alluvium and are characterized by high clay content (50-70 %), alkaline in reaction, calcareous with slow permeability. These soils pose soil degradation problems of salinity and sodicity on surface irrigation with well water. Salinity of ground water is historical phenomenon in Purna alluvial tract.



Oozing of salts from dry bank of *khar nala* in summer

The soils are characterized by salinity and sodicity, however, the presence of salt efflorescence on surface is hardly seen. Shrinking and swelling of soil is predominantly observed. The soils have low hydraulic conductivity and thus become susceptible for poor drainage. The problem is further aggravated due to sodium and clay causing dispersion resulting into impairment in physical properties of soils like bulk density, hydraulic conductivity, porosity and infiltration rate. The farmers in the valley are therefore compelled to grow crops exclusively on rain water.

Swell – shrink soils showing wide cracks

Some areas have sodicity problem in the sub soil. The pH is in the range of 8.1 to 9.4, exchangeable sodium ranges from 4 - 21 per cent and electrical conductivity from 0.3 to 5.2 d Sm^{-1}. The well water in Purna valley is alkaline.

The farmers of the valley face problems like water stagnation in rainy season, poor drainage, deterioration of soil structure, moisture stress and soil erosion. For management of problematic soils in this valley several integrated reclamation technologies are recommended but all are beyond the economic limits of the farmers and not affordable by the farmers at all.

Keeping in view the problems at grass root level Mr. Arvind Nalkande adopted a simple, affordable and a efficient technique of rain water management and soil erosion control at village Dhamodi, Tq. Daryapur, Distt. Amravati,(M.S.) India.

He adopted and introduced the simple approach of *in situ* rain water and soil conservation by adopting following steps.

i) Use of natural soil cracks for conservation of rainwater

During summer cracks used to developed in the agricultural fields. Mr. Arvind Nalkande created the awareness for not to disturbed the cracks prior to commencement of monsoonic rains and allowed water and soil to conserved through the cracks, which enhanced the soil moisture content in the soil profile. The farmers those are adopting this technology are advised to take the semi rabi or rabi crops in such fields.

ii) Contour cultivation for *in situ* soil and water conservation

iii) Use of farm pond for collecting runoff.

iv) Reuse of water from farm pond as a protective irrigation during prolonged monsooic break

II. Describe how the innovation saves water

The Dhamodi village is under saline tract of Daryapur Tahsil. The soils of this village are mostly deep black soils. During summer season these soils cracks. Mr. Arvind Nalkande did not follow the traditional practice of cultivation in summer instead he uses these natural cracks of soils to restore rain water.

Then he draw a contour guide line in the fields and cultivated the land parallel to the contour guideline. He had cultivated the kharif crops parallel to the contour guide line. Thus every crop row will act as a contour for the field and thus conservation of rain and soil had been done and excess water will safely go into the common drain line which ultimately connected to the farm pond. The excess runoff is collected into the farm pond. The stored water in a farm pond is used for life saving irrigation in a limited area and also used for drinking water for livestock and other animals.

By the adoption of these *in situ* soil and rain water conservation techniques about 10 per cent runoff has been reduced and enhanced the soil moisture level in soil profile. The average rainfall of the area is about 850 mm. Over 1 hectare area about 850 m^3 of rain water conserved more and therefore over the area of 100 ha. the additional rain water conserved was to the tune of 85000 m^3. Which enhanced the soil moisture percentage to about 35 to 40 per cent and leads to enhanced the yield levels by 40 to 45 per cent in rainfed condition. The practice introduced also helpful to enhanced the water use efficiency.



III. Describe how the innovation was introduced and spread (for Young Professional award, describe how the innovation <u>will be</u> introduced and spread).

Thus Mr. Arvind Nalkande practiced the model of *in situ* rain water conservation in Dhamodi village and achieved the following aspects.

i) Utilization of the land according to its physical properties had been done.

ii) Conserved as much rain water as possible at the place where it falls.

iii) Drained out excess water with a safe velocity and diverted it to storage ponds and stored it for future use.

iv) Avoided gully formation and controlled soil erosion and recharged ground water.

v) Maximized productivity per unit area and per unit of water.

He practiced these techniques in his own field and after visible benefits he demonstrated these techniques to the farmers and promoted the practical implementation on the farmers field in his village.

IV. Describe the scope for further expansion of the innovation

Rainfed arable lands are predominant (80%) worldwide and contribute 60 per cent of the worlds cereal out put. In developing countries upto 70 per cent of the population depends directly or indirectly on agriculture. Most of the rainfed areas in developing countries suffer from one or another form of land degradation. Due to variations in seasonal rains during the crop growing period, crops may face drought and sometimes water logging due to torrential downpours causing runoff. In order to conserve rainwater, minimize land degradation, improve ground water recharge, increase crop intensity and crop productivity a “Rainwater Conservation through Natural Cracks Developed in the Deep Black Soils” approach followed by contour sowing and collection of excess water in a farm pond should be adopted. At present about 100 ha. area is covered under these in situ soil and water conservation techniques and farmers from adjacent villages are ready to adopt this simple concept. In this way there is a scope for further expansion of his innovation.



V. Describe the roles of the individual nominees.

Mr. Arvind Nalkande is a progressive farmer. He is aware of the importance of in situ soil and water conservation in changing scenario. Therefore he himself developed a simple innovative approach of soil and water conservation techniques and adopted the same on his own field. By seeing the benefits of the techniques he promoted these techniques on other farmers field in the village Dhamodi. At present about 100 ha area is covered under in situ rain water conservation techniques. He motivated the farmers in his village for adoption of his model for getting maximum yields in kharif and rabi season. He wants to expand these techniques in entire Daryapur Tahsil so that per drop of water should be used for getting maximum production in saline tract of Vidarbha region.